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TRUE-INTEGRATING ENVIRONMENTAL NOISE MONITOR AND SOUND EXPOSURE--ETC(U)
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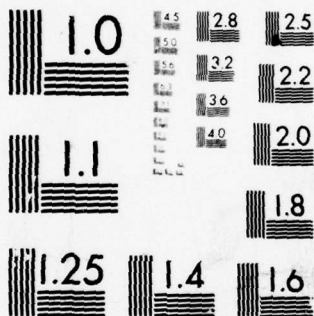
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TECHNICAL REPORT N-41

June 1979

Prediction of the Noise Impact Within
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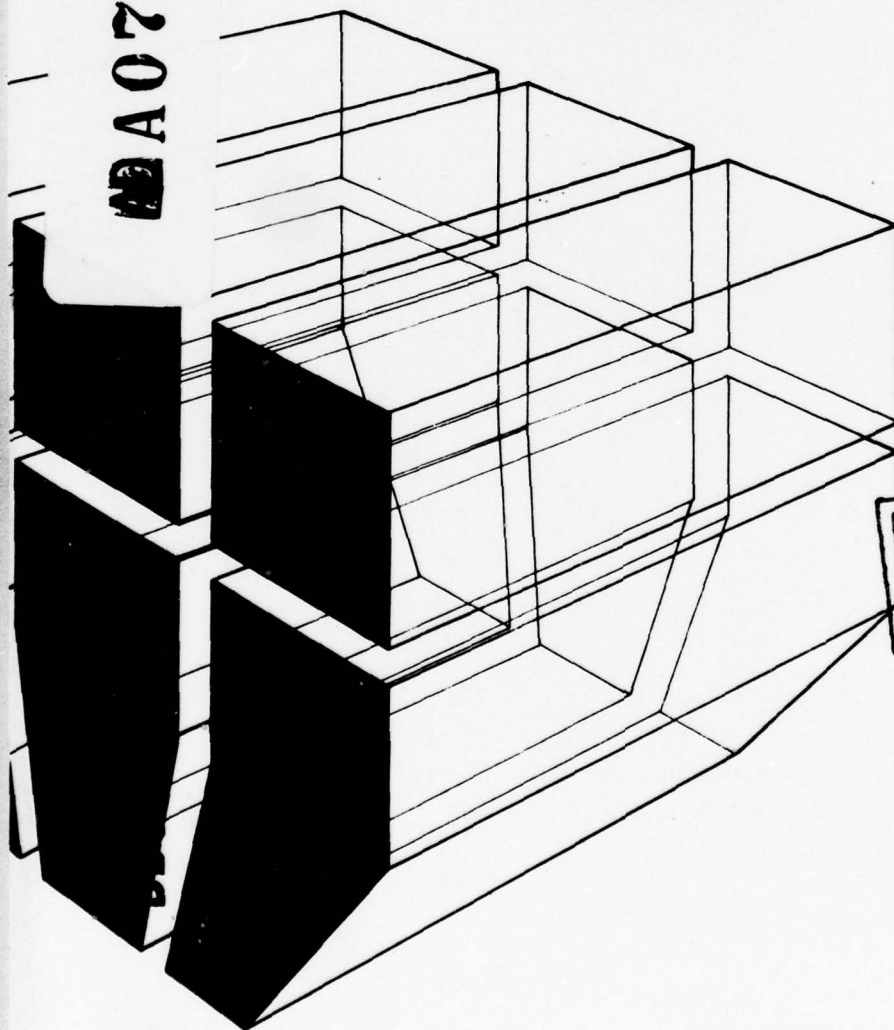
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TRUE-INTEGRATING ENVIRONMENTAL NOISE
MONITOR AND SOUND EXPOSURE LEVEL METER
VOLUME II: WIRING AND PARTS LISTS,
PARTS LAYOUTS, AND SCHEMATICS

LEVEL

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by
A. J. Averbuch
P. D. Schomer
M. W. Weisberg

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides the complete hardware construction of the CERL environmental noise monitor. Included are: (1) a task block diagram of the unit, (2) a parts list and diagram of the front panel, (3) a parts list and diagram of the power supply circuit, (4) a list of the back plane wiring, (5) parts list, layout, and schematics of the PC boards, and (6) wiring list for cables and connectors.		

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FOREWORD

This research was conducted for the Directorate of Military Programs, Office of the Chief of Engineers (OCE), under Project 4A762720A896, "Environmental Quality for Construction and Operation of Military Facilities"; Task 03, "Pollution Control Technology"; Work Unit 001, "Prediction of the Noise Impact Within and Adjacent to Army Facilities." The QCR number is 1.03.011. Mr. F. P. Beck, DAEN-MPE-I, is the OCE Technical Monitor.

The work was performed by the Environmental Division (EN), U.S. Army Construction Engineering Research Laboratory (CERL). Dr. R. K. Jain is Chief of EN.

COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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TRUE-INTEGRATING ENVIRONMENTAL
NOISE MONITOR AND SOUND-
EXPOSURE LEVEL METER
VOLUME II: MONITOR CONSTRUCTION --
PARTS, LAYOUT, AND SCHEMATICS

1 INTRODUCTION

Background

The Environmental Protection Agency (EPA) has recommended the day-night average level (L_{dn}) as the measure to use for assessing normal environmental noise, and the C-weighted day-night level (L_{Cdn}) as the measure for assessing impulsive noises (for example, from artillery, armor, sonic boom, etc.). Explicit in the EPA's recommendation is a requirement to directly integrate the instantaneous square of the sound pressure as a function of time. In a practical sense, this direct integration can be approximated for most continuous noise sources by integration the output of a root-mean-square (RMS) detector (for example, like the detector employed in the normal sound-level meter). However, in the case of highly impulsive noises, and especially for single events, the integration of an RMS detector output may yield erroneous results because the quantity found is the impulse response of the detector itself, rather than the true square of the pressure as a function of time.

The Construction Engineering Research Laboratory (CERL) has designed and constructed monitors for its own use and for the Federal EPA; in addition, CERL has studied the features of commercial noise monitors for the Federal EPA¹ and participated in the National Academy of Science efforts to define noise assessment procedures for Federal activities.² These studies have made apparent certain physical characteristics within the design of the monitor for measuring Army-specific noises (see Volume I).

¹ P. D. Schomer and A. J. Averbuch, Analysis of Environmental Noise Monitors, Technical Report N-21/ADA040005 (U.S. Army Construction Engineering Research Laboratory [CERL], April 1977).

² Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Environmental Impact of Noise, Committee on Hearing, Bioacoustics, and Biomechanics, Assembly of Behavioral and Social Sciences (National Research Council of the National Academy of Sciences, 1977).

Purpose

The purpose of this report is to describe the construction, and provide parts lists, layout, and schematics for the CERL environmental noise monitor.

Outline of Report

Chapter 2 provides a block diagram of the monitor. Chapter 3 provides a parts list and diagram of the front panel. Chapter 4 provides a parts list of the monitor's power supply circuit. Chapter 5 is a list of the monitor's back plane wiring components, and Chapter 6 provides a parts list, parts layout, and schematics for the PC Boards. Chapter 7 is a list of the monitor's cable and connector wiring.

2 BLOCK DIAGRAM OF MONITOR

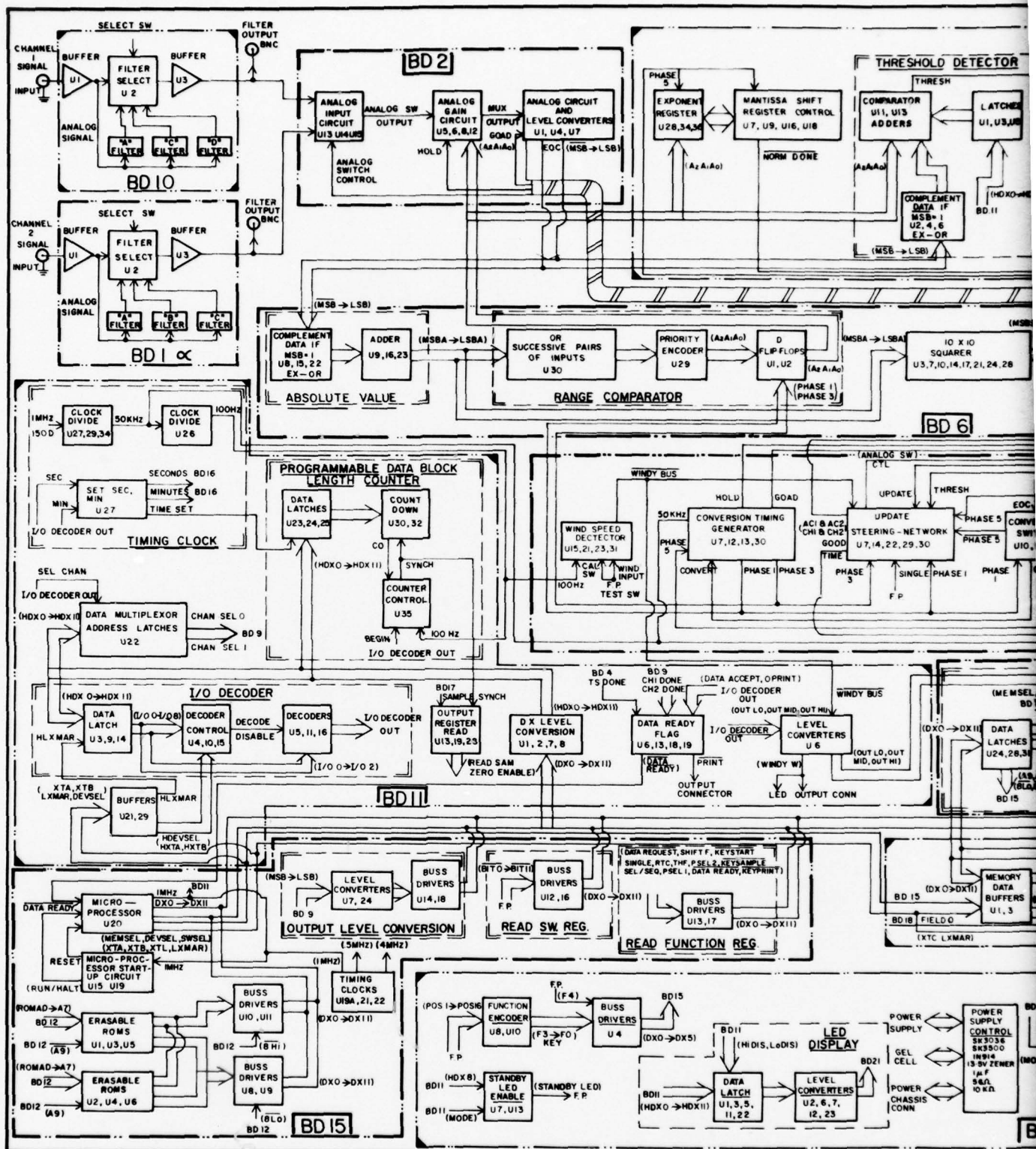
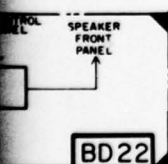
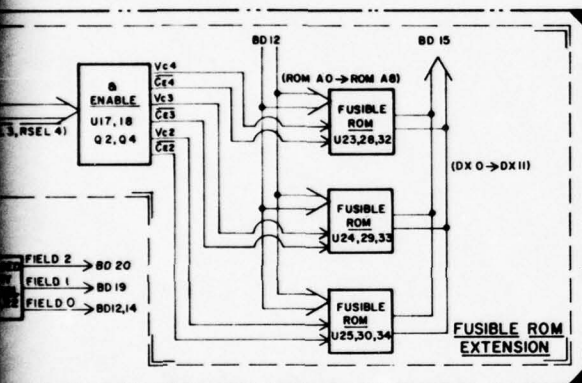
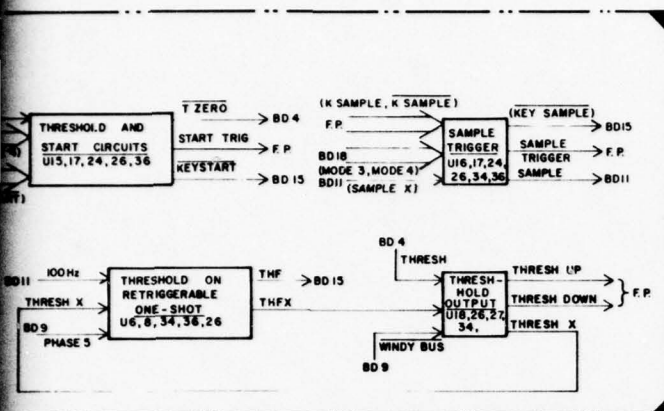


Figure 1. Block diagram of Model 270 true integrating environmental noise monitor and sound exposure level meter.



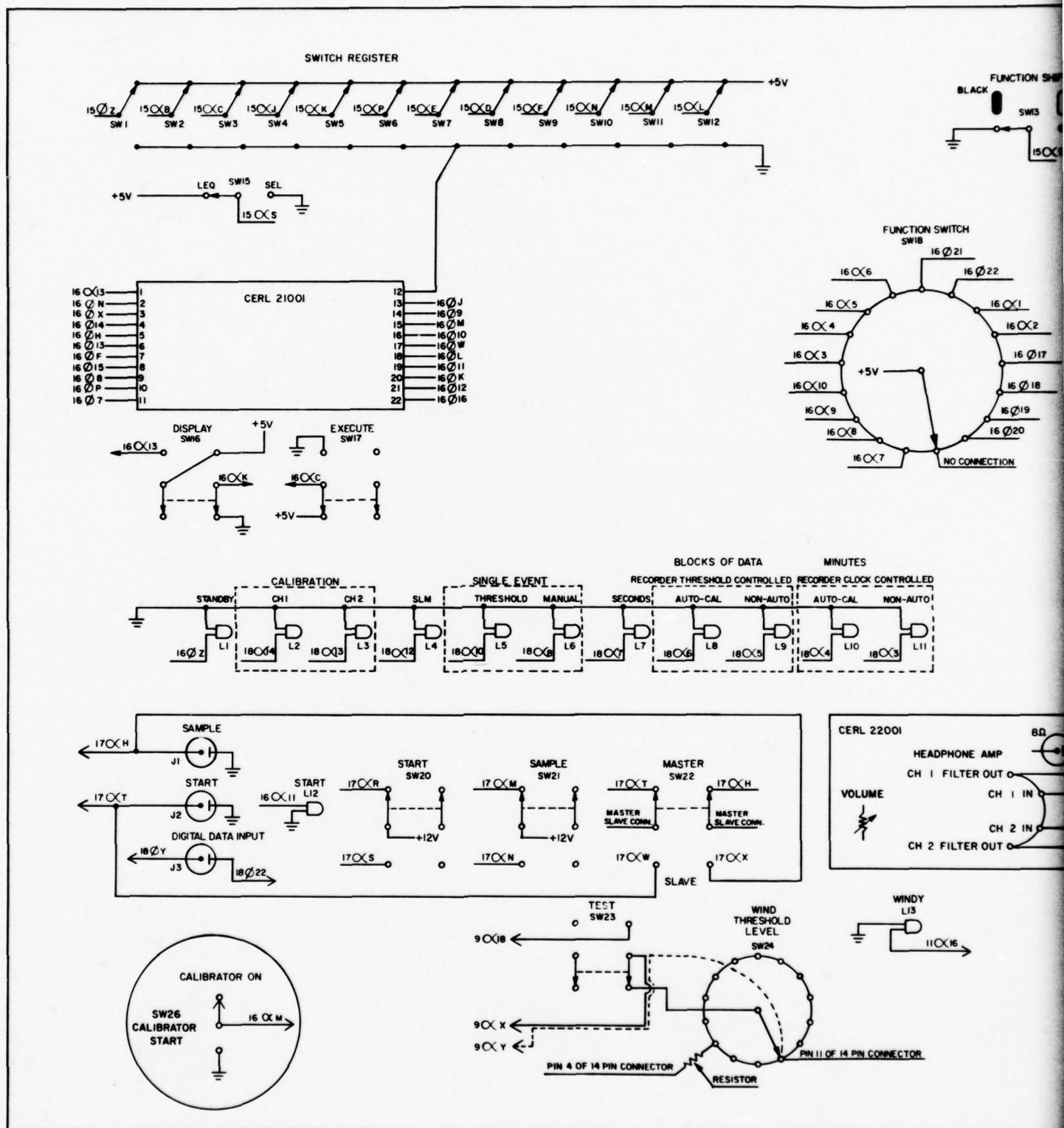
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CHECKED <i>MMH 3/11/78</i>	TRUE INTEGRATING	ENGINEER
APPROVED <i>A.J.A. 4/1/78</i>	ENVIRONMENTAL NOISE MONITOR	CONSTRUCTION ENGINEERING
TRACED	AND SOUND EXPOSURE	RESEARCH LABORATORY
DATE	LEVEL METER	(CHAMPAIGN, IL)
SCALE		DWG. NO.
		SHEET 2 OF 2

3 FRONT PANEL -- PARTS LIST AND SCHEMATIC

Table 1

Front Panel -- Parts List

Diagram Reference	Part Type and Manufacturer Number
SW1-SW13, SW15 SW14, SW19, SW27	SPDT switch ALCO MTE-106D 3 pole 2-5 pos non-shorting rotary switch CENTRALAB PSA-207
SW16, SW17, SW20, SW21, SW23 SW18, SW24, SW26	DPDT spring-loaded switch ALCO MTE-206R non-shorting 2-17 pos rotary switch Mallory 32117J
SW22	DPDT switch ALCO MTE-206N
L1	yellow led Monsanto MV5352
L2-L13	red led Monsanto MV5752
J1, J2, J11	non-insulated BNC connector Amphenol 74868 UG-1094/U
J3, J5-J10	insulated BNC connector Amphenol 31-10
J12	Viking THORKOM TFR09-101P
CERL 21001	PC Board No. 21001 display
CERL 22001	PC Board No. 22001 headphone amp
R1	100 K potentiometer



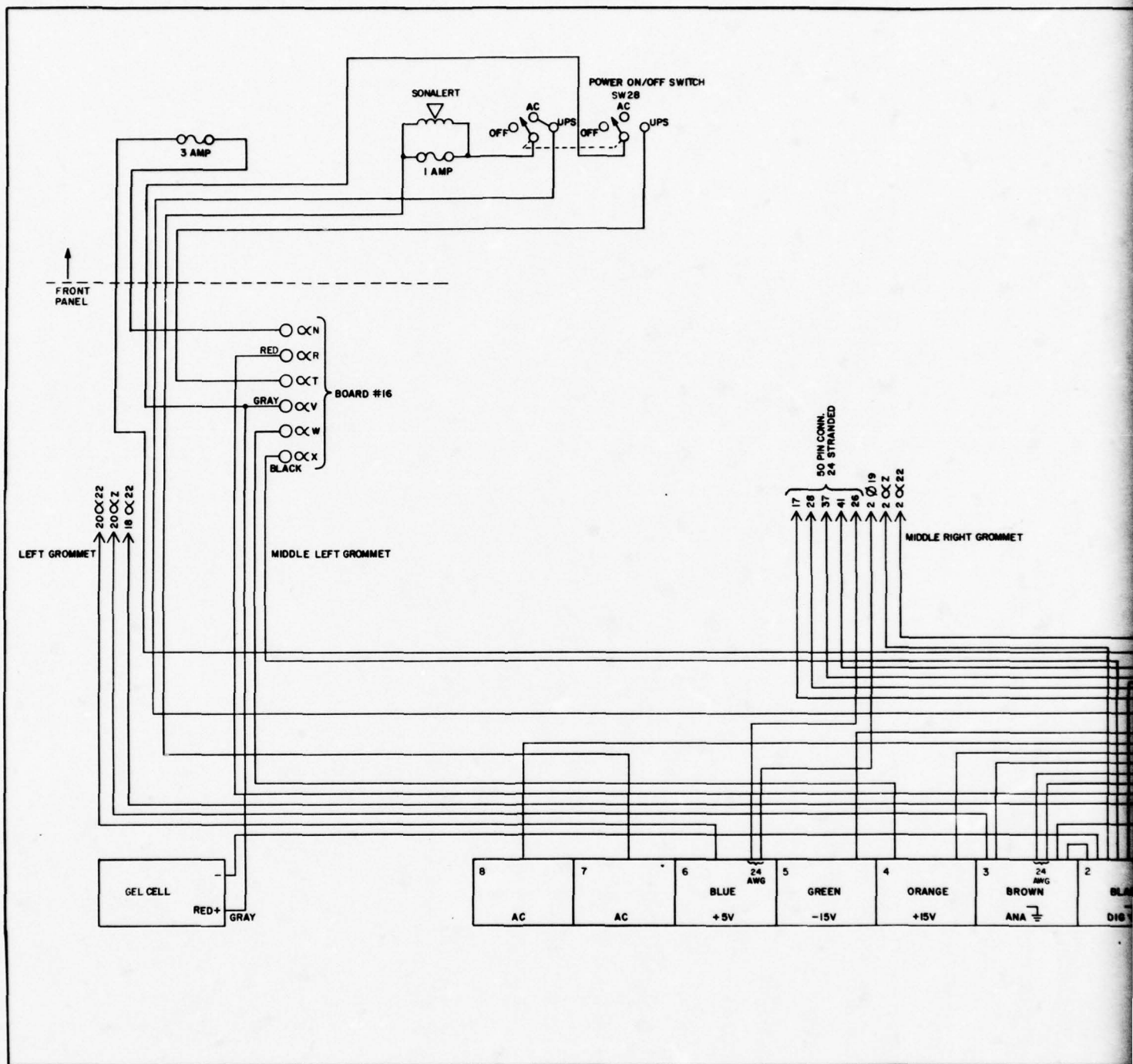


4 POWER SUPPLY CIRCUIT--PARTS LIST
AND SCHEMATIC

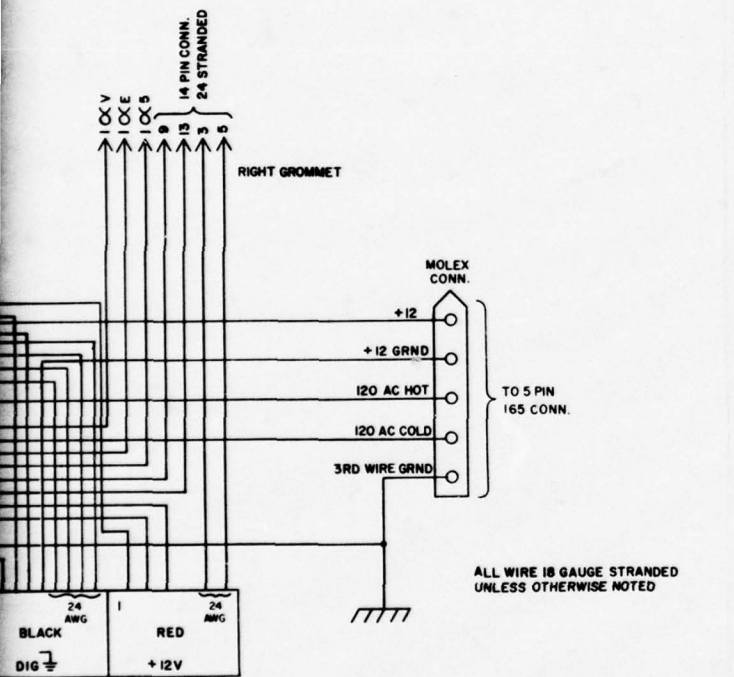
Table 2

Power Supply Circuit -- Parts List

Part Description	Part Number
Fuse holders--waterproof 20/A 250 V max	Littlefuse FHN 20G
1-amp fuse 125 V SLO-BLO	
3-amp fuse 125 V	
SW28 - 3 pol 2-5 pos non-shortng rotary switch	CENTRALAB PSA-207
Sonalert Electronic Signal 110-VAC pulsing 2900 Hz	Mallory SC110P
Rechargeable battery 12-V 5.0/AH lead acid	Gates 0800-0016
Uninterruptible power supply system	Semiconductor Circuits UPS12-2T3



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



REQD	PART NO.	DESCRIPTION	MATL.	MATL. SPEC.	UNIT WT.
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APPROVED FOR CONSTRUCTION	APPROVED	CHECKED: RMM 3/13/78	DIAGRAM, SCHEMATIC POWER SUPPLY WIRING	
		APPROVED: A.J.A. 5/15/78		
TRACED	DATE	SCALE		

5 MONITOR BACK PLANE WIRING LIST

Each PC board in the monitor is divided into two halves, labeled " α " and " ϕ ". Each half has 22 output pins on each side. One side's outputs are numbered 1 through 22; the others are labeled with 22 letters. Similarly, the back plane of the monitor chassis is divided into two halves, also labeled " α " and " ϕ ". Therefore, the back plane consists of two rows of 44 pin connectors.

The wiring list shows the connections to be made between these 44 pin connectors. Some connections also have to be made to the power supply (PS), to the front panel (FP), and to the various chassis connectors. For more details on the connections to the power supply, front panel, and connectors, see the corresponding diagrams and lists.

To facilitate the wiring of the back plane, several busses were wired from the power supply. When a particular pin is to be wired to a buss, the name of the signal is given and the buss is designated by a dagger. The various busses are listed below in Table 3.

In the wiring list, an asterisk in the origin column means that the pin in question is the origin of that signal. The double dagger indicates that Board 8 has many signal pins which must be connected to ground.

Table 3
Wiring List for Power Supply Busses

Digital Ground

PS pin 2 $\left\{ \begin{array}{l} 2\phi A \rightarrow \dots \text{all boards } \phi A \dots \rightarrow 21 \phi A \\ 2\alpha Z \rightarrow \dots \text{all boards } \alpha Z \dots \rightarrow 21 \alpha Z \end{array} \right. \rightarrow \text{PS}$

+12 V

PS pin 1 $\left\{ \begin{array}{l} 2\phi 1 \rightarrow 4\phi 1 \rightarrow 6\phi 1 \rightarrow 8\text{Lo}1\phi 1 \rightarrow 8\text{Hi}1\phi 1 \rightarrow \\ 2\alpha 22 \rightarrow 4\alpha 22 \rightarrow 6\alpha 22 \rightarrow 8\text{Lo}1\alpha 22 \rightarrow 8\text{Hi}1\alpha 22 \rightarrow \end{array} \right.$

$\rightarrow 8\text{Lo}2\phi 1 \rightarrow 8\text{Hi}2\phi 1 \rightarrow 9\phi 1 \rightarrow 11\phi 1 \rightarrow 16\phi 1 \rightarrow 17\phi 1 \rightarrow 18\phi 1$

$\rightarrow 8\text{Lo}2\alpha 22 \rightarrow 8\text{Hi}2\alpha 22 \rightarrow 9\alpha 22 \rightarrow 11\alpha 22 \rightarrow 16\alpha 22 \rightarrow 17\alpha 22 \rightarrow 18\alpha 22$ $\rightarrow \text{PS}$

+5 V

PS pin 6 $\rightarrow 2\phi 19 \left\{ \begin{array}{l} 11\phi B \rightarrow 12\phi 1 \rightarrow 14\phi 1 \rightarrow 15\phi 1 \rightarrow 16\phi 2 \rightarrow 17\phi 2 \rightarrow \\ 11\alpha Y \rightarrow 12\alpha 22 \rightarrow 14\alpha 22 \rightarrow 15\alpha 22 \rightarrow 16\alpha 21 \rightarrow 17\alpha 21 \rightarrow \end{array} \right.$

$\rightarrow 18\phi 2 \rightarrow 19\phi 1 \rightarrow 20\phi 1 \rightarrow 21\phi 1$

$\rightarrow 18\alpha 21 \rightarrow 19\alpha 22 \rightarrow 20\alpha 22 \rightarrow 21\alpha 22$ \rightarrow

Analog ground

PS pin 3 $\rightarrow 1\alpha 5 \left\{ \begin{array}{l} 1\phi 5 \\ 2\phi Z \end{array} \right.$

+15 V

PS pin 4 $\rightarrow 1\alpha E \rightarrow 1\phi E \rightarrow 2\phi X$

-15 V

PS pin 5 $\rightarrow 1\alpha V \rightarrow 1\phi V \rightarrow 2\phi Y$

Board No. 2, Side ϕ

Pin	Signal Name	Origin
1	+12	PS +
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19	+5	PS +
20		
21		
22		

Board No. 2, Side ϕ

Pin	Signal Name	Origin	
A	Digital Ground	PS	+
B	EOC	*	9 α 20
C	MSB	*	4 ϕ 19, 6 ϕ R, 17 ϕ C
D	MSB-1	*	4 ϕ Z, 6 ϕ N, 17 ϕ D
E	MSB-4	*	4 ϕ P, 6 ϕ C, 17 ϕ H
F	MSB-3	*	4 ϕ N, 6 ϕ B, 17 ϕ F
H	MSB-2	*	4 ϕ M, 6 ϕ M, 17 ϕ E
J	LSB+2	*	4 ϕ 4, 6 ϕ D, 17 ϕ L
K	LSB+3	*	4 ϕ 3, 6 ϕ K, 17 ϕ K
L	LSB+4	*	4 ϕ R, 6 ϕ L, 17 ϕ J
M	LSB+1	*	4 ϕ 5, 6 ϕ E, 17 ϕ M
N	LSB	*	4 ϕ 6, 6 ϕ H, 17 ϕ N
P			
R			
S			
T	GOAD	9 α M	
U			
V			
W			
X	+15 V	PS	1 α E, 1 ϕ E
Y	-15 V	PS	1 α V, 1 ϕ V
Z	Analog Ground	PS	1 α 5, 1 ϕ 5

Board No. 2, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10	Chan 1 input GND	1 ϕ 17
11		
12		
13		
14		
15		
16	Ch 1 filter bd GND	1 ϕ 11
17	Ch 2 filter bd GND	1 α 11
18		
19		
20		
21	Ch 2 input GND	1 α 17
22	+12V	PS +

Board No. 2, Side α

Pin	Signal Name	Origin
A	A ₂	6 ϕ F 4 ϕ X, 4 α R, 17 ϕ 5
B	A ₁	6 ϕ J 4 ϕ Y, 4 α Y, 17 ϕ 4
C	A ₀	6 ϕ P 4 ϕ 20, 4 α X, 17 ϕ 3
D		
E		
F		
H		
J	HOLD	9 α P
K	ANALOG SWITCH CONTROL	9 α 9 17 ϕ R
L	Ch 1 input (analog)	1 ϕ U
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y	Ch 2 input (analog)	1 α U
Z	Digital Ground	PS †

Board No. 4, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	+
2			
3	LSB +3	2 ϕ K	6 ϕ K, 17 ϕ K
4	LSB +2	2 ϕ J	6 ϕ D, 17 ϕ L
5	LSB +1	2 ϕ M	6 ϕ E, 17 ϕ M
6	LSB	2 ϕ N	6 ϕ H, 17 ϕ N
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19	MSB	2 ϕ C	6 ϕ R, 17 ϕ C
20	A ₀	6 ϕ P	4 α X, 2 α C, 17 ϕ 3
21	THRESH	*	9 α U, 17 α J
22	HIGH BIT TIME	*	

Board No. 4, Side ϕ

Pin	Signal Name	Origin
A	Digital Ground	PS +
B	GOOD TIME	9 α T
C	HDX0	11 ϕ H 16 α L, 18 α 16
D	HDX1	11 ϕ J 16 ϕ 4, 18 α 17
E	HDX2	11 ϕ K 16 ϕ 6, 18 α 18
F	HDX3	11 ϕ L 16 ϕ 5, 18 α 19
H	HDX4	11 ϕ M 16 ϕ C, 18 α K
J	HDX5	11 ϕ N 16 ϕ B, 18 α J
K	HDX6	11 ϕ P 16 ϕ D
L	HDX7	11 ϕ R 16 ϕ E
M	MSB-2	2 ϕ H 6 ϕ M, 17 ϕ E
N	MSB-3	2 ϕ F 6 ϕ B, 17 ϕ F
P	MSB-4	2 ϕ E 6 ϕ C, 17 ϕ H
R	LSB+4	2 ϕ L 6 ϕ L, 17 ϕ J
S	THSET	11 α 1
T	HDX8	11 ϕ S 16 ϕ T
U	HDX9	11 ϕ T 16 ϕ S
V	HDX10	11 ϕ U 16 ϕ V
W	HDX11	11 ϕ V 16 ϕ U
X	A ₂	6 ϕ F 4 α R, 2 α A, 17 ϕ 5
Y	A ₁	6 ϕ J 4 α Y, 2 α B, 17 ϕ 4
Z	MSB-1	2 ϕ D 6 ϕ N, 17 ϕ D

Board No. 4, Side α

Pin	Signal Name	Origin
1	MSBT	* 9 ϕ V
2	MSBT-1	* 9 ϕ M
3	MSBT-2	* 9 ϕ Z
4	LSBT+2	* 9 ϕ 14
5		
6	$\overline{\text{TZERO}}$	17 α D
7		
8		
9		
10	T-UNDERFLOW	9 ϕ D
11		
12		
13		
14		
15	$\overline{\text{TSCK}}$	* 9 ϕ 6
16		
17	SR LOAD	* 8Lo1 ϕ 4, 8Lo2 ϕ 4
18	UPDATE	* 9 α N, 17 α A
19	$\overline{\text{NORM DONE}}$	*
20	READ SAM	11 α L
21	ZERO	* 8Lo1 α 20, 8Hi1 α 20, 8Hi2 α 20, 8Lo2 α 20, 17 ϕ U
22	+12	PS +

Board No. 4, Side α

Pin	Signal Name	Origin
A	LSBT+1	* 9 α L
B	LSBT	* 9 α C
C	LSBT-1	*
D	50 kHz	11 α 11 9 α 10
E		
F	Norm Clock	*
H	1.8 MHz	*
J	SR CLK	* 8Lo1 ϕ 5, 8Lo2 ϕ 5
K	TSR LOAD	*
L	NORM REQ	*
M	TSR CLOCK	*
N	TS DONE	* 11 α 13
P	CARRY OUT	*
R	A ₂	6 ϕ F 4 ϕ X, 2 α A, 17 ϕ 5
S	NORM DONE	*
T	PHASE 5	9 α R 17 ϕ T
U	LOAD ZERO	*
V	ZERO ENABLE	11 α 20
W	LOAD SAM	* 9 ϕ B
X	A ₀	6 ϕ P 4 ϕ 20, 2 α C, 17 ϕ 3
Y	A ₁	6 ϕ J 4 ϕ Y, 2 α B, 17 ϕ 4
Z	Digital ground	PS +

Board No. 6, Side ϕ

Pin	Signal Name	Origin
1	+12	PS +
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Board No. 6, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	MSB-3	2 ϕ F	4 ϕ N, 17 ϕ F
C	MSB-4	2 ϕ E	4 ϕ P, 17 ϕ H
D	LSB+2	2 ϕ J	4 ϕ 4, 17 ϕ L
E	LSB+1	2 ϕ M	4 ϕ 5, 17 ϕ M
F	A ₂	*	4 ϕ X, 4 α R, 2 α A, 17 ϕ 5
H	LSB	2 ϕ N	4 ϕ 6, 17 ϕ N
J	A ₁	*	4 ϕ Y, 4 α Y, 2 α B, 17 ϕ 4
K	LSB+3	2 ϕ K	4 ϕ 3, 17 ϕ K
L	LSB+4	2 ϕ L	4 ϕ R, 17 ϕ J
M	MSB-2	4 ϕ H	4 ϕ M, 17 ϕ E
N	MSB-1	2 ϕ D	4 ϕ Z, 17 ϕ D
P	A ₀	*	4 ϕ 20, 4 α X, 2 α C, 17 ϕ 3
R	MSB	2 ϕ C	4 ϕ 19, 17 ϕ C
S			
T	PHASE 1	9 ϕ 10	17 ϕ S
U	PHASE 3	9 α 1	
V			
W			
X			
Y			
Z			

Board No. 6, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22	+12	PS +

Board No. 6, Side α

Pin	Signal Name	Origin
A		
B	MSBSQ+2	* 8Lo1 α D, 8Lo2 α D
C	MSBSQ+1	* 8Lo1 α C, 8Lo2 α C
D	MSBSQ	* 8Lo1 α B, 8Lo2 α B
E	MSBSQ-1	* 8Lo1 ϕ Y, 8Lo2 ϕ Y
F	MSBSQ-2	* 8Lo1 ϕ X, 8Lo2 ϕ X
H	MSBSQ-3	* 8Lo1 ϕ W, 8Lo2 ϕ W
J	MSBSQ-4	* 8Lo1 ϕ V, 8Lo2 ϕ V
K	MSBSQ-5	* 8Lo1 ϕ U, 8Lo2 ϕ U
L	MSBSQ-6	* 8Lo1 ϕ T, 8Lo2 ϕ T
M	MSBSQ-7	* 8Lo1 ϕ S, 8Lo2 ϕ S
N	MSBSQ-8	* 8Lo1 ϕ R, 8Lo2 ϕ R
P	LSBSQ+8	* 8Lo1 ϕ P, 8Lo2 ϕ P
R	LSBSQ+7	* 8Lo1 ϕ N, 8Lo2 ϕ N
S	LSBSQ+6	* 8Lo1 ϕ M, 8Lo2 ϕ M
T	LSBSQ+5	* 8Lo1 ϕ L, 8Lo2 ϕ L
U	LSBSQ+4	* 8Lo1 ϕ K, 8Lo2 ϕ K
V	LSBSQ+3	* 8Lo1 ϕ H, 8Lo2 ϕ H
W	LSBSQ+2	* 8Lo1 ϕ F, 8Lo2 ϕ F
X	LSBSQ+1	* 8Lo1 ϕ E, 8Lo2 ϕ E
Y	LSBSQ	* 8Lo1 ϕ D, 8Lo2 ϕ D
Z	Digital ground	PS †

Board No. 8 Lo1, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	OSR CARRY IN	PS	††
3	SR CARRY IN	PS	††
4	SR LOAD	4 α 17	8Lo2 ϕ 4
5	SR CLK	4 α J	8Lo2 ϕ 5
6	OSR-4	*	
7	OSR-3	*	
8	OSR-2	*	
9	OSR-1	*	
10	OSR-8	*	
11	OSR-7	*	
12	OSR-6	*	
13	OSR-5	*	
14	OSR-12	*	
15	OSR-11	*	
16	OSR-10	*	
17	OSR-9	*	
18	OSR-16	*	
19	OSR-15	*	
20	OSR-14	*	
21	OSR-13	*	
22	OSR-20	*	

Board No. 8 Lol, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	OSR LOAD	9 ϕ 11 8Hi2 ϕ B, 8Hi1 ϕ B, 8Lo2 ϕ B, 17 ϕ 18
C	OSR CLOCK Ch1	9 ϕ 12 8Hi1 ϕ C
D	LSBSQ	6 α Y 8Lo2 ϕ D
E	LSBSQ+1	6 α X 8Lo2 ϕ E
F	LSBSQ+2	6 α W 8Lo2 ϕ F
H	LSBSQ+3	6 α V 8Lo2 ϕ H
J	ADDER CARRY IN	PS ++
K	LSBSQ+4	6 α U 8Lo2 ϕ K
L	LSBSQ+5	6 α T 8Lo2 ϕ L
M	LSBSQ+6	6 α S 8Lo2 ϕ M
N	LSBSQ+7	6 α R 8Lo2 ϕ N
P	LSBSQ+8	6 α P 8Lo2 ϕ P
R	MSBSQ-8	6 α N 8Lo2 ϕ R
S	MSBSQ-7	6 α M 8Lo2 ϕ S
T	MSBSQ-6	6 α L 8Lo2 ϕ T
U	MSBSQ-5	6 α K 8Lo2 ϕ U
V	MSBSQ-4	6 α J 8Lo2 ϕ V
W	MSBSQ-3	6 α H 8Lo2 ϕ W
X	MSBSQ-2	6 α F 8Lo2 ϕ X
Y	MSBSQ-1	6 α E 8Lo2 ϕ Y
Z		

Board No. 8 Lol, Side α

Pin	Signal Name	Origin
1	OSR-19	*
2	OSR-18	*
3	OSR-17	*
4	OSR-24	*
5	OSR-23	*
6	OSR-22	*
7	OSR-21	*
8	OSR-28	*
9	OSR-27	*
10	OSR-26	*
11	OSR-25	*
12	OSR-32	*
13	OSR-31	*
14	OSR-30	*
15	OSR-29	*
16	OSR-36 (OSR CARRY OUT)	* 8 Hi1 ϕ 2
17	OSR-35	*
18	OSR-34	*
19	OSR-33	*
20	ZERO	4 α 21 8 Hi1 α 20, 8 Hi2 α 20, 8 Lo2 α 20, 17 ϕ U
21	AC1 (UPDATE)	9 α 12 8 Hi1 α 21
22	+12 V	PS +

Board No. 8 Lo1, Side α

Pin	Signal Name	Origin	
A			
B	MSBSQ	6 α D	8 Lo2 α B
C	MSBSQ+1	6 α C	8 Lo2 α C
D	MSBSQ+2	6 α B	8 Lo2 α D
E	MSBSQ+3	PS	++
F	MSBSQ+4	PS	++
H	MSBSQ+5	PS	++
J	MSBSQ+6	PS	++
K	MSBSQ+7	PS	++
L	MSBSQ+8	PS	++
M	MSBSQ+9	PS	++
N	MSBSQ+10	PS	++
P	MSBSQ+11	PS	++
R	MSBSQ+12	PS	++
S	MSBSQ+13	PS	++
T	MSBSQ+14	PS	++
U	MSBSQ+15	PS	++
V	MSBSQ+16	PS	++
W	MSBSQ+17	PS	++
X	MSBSQ+18	PS	++
Y	ADDER CARRY OUT	*	8 Hi1 ϕ J
Z	Digital ground	PS	+

Board No. 8 Hil, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS +
2	OSR-36	8Lol α 16
3		
4		
5		
6	OSR-40	*
7	OSR-39	*
8	OSR-38	*
9	OSR-37	*
10	OSR-44	*
11	OSR-43	*
12	OSR-42	*
13	OSR-41	*
14	OSR-48	*
15	OSR-47	*
16	OSR-46	*
17	OSR-45	*
18	OSR-52	*
19	OSR-51	*
20	OSR-50	*
21	OSR-49	*
22	OSR-56	*

Board No. 8 Hi1, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	OSR LOAD	9 ϕ 11 8 Hi2 ϕ B, 8 Lo2 ϕ B, 8 Lo1 ϕ B, 17 ϕ 18
C	OSR CLOCK Ch 1	9 ϕ 12 8 Lo1 ϕ C
D		
E		
F		
H		
J	ADDER CARRY OUT	8Lo1 α Y
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		

Board No. 8 Hi1, Side α

Pin	Signal Name	Origin
1	OSR-55	*
2	OSR-54	*
3	OSR-53	*
4	OSR-60	*
5	OSR-59	*
6	OSR-58	*
7	OSR-57	*
8	OSR-64	*
9	OSR-63	*
10	OSR-62	*
11	OSR-61	*
12	LSB0+2 Ch 1	* 9 ϕ 16
13	LSB0+1 Ch 1	* 9 α J
14	LSB0 Ch 1	* 9 α E
15	OSR-65	*
16	HIGH BIT Ch 1	* 9 α A
17	MSB0 Ch 1	* 9 ϕ T
18	MSB0-1 Ch 1	* 9 ϕ P
19	MSB0-2 Ch 1	* 9 ϕ X
20	ZERO	4 α 21 8 Lo1 α 20, 8 Hi2 α 20, 8 Lo2 α 20, 17 ϕ U
21	AC 1 (UPDATE)	9 α 12 8 Lo1 α 21
22	+12 V	PS +

Board No. 8 Hil, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
F		
H		
H		
J		
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y	ADDER OVERFLOW	*
Z	Digital ground	PS +

Board No. 8 Lo2, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	+
2	CARRY IN	PS	++
3	CARRY IN	PS	++
4	SR LOAD	4 α 17	8 Lo1 ϕ 4
5	SR CLK	4 α J	8 Lo1 ϕ 5
6	OSR-4	*	
7	OSR-3	*	
8	OSR-2	*	
9	OSR-1	*	
10	OSR-8	*	
11	OSR-7	*	
12	OSR-6	*	
13	OSR-5	*	
14	OSR-12	*	
15	OSR-11	*	
16	OSR-10	*	
17	OSR-9	*	
18	OSR-16	*	
19	OSR-15	*	
20	OSR-14	*	
21	OSR-13	*	
22	OSR-20	*	

Board No. 8 Lo2, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	+
B	OSR LOAD	9 ϕ 11	8Hi2 ϕ B, 8Hi1 ϕ B, 8Lo1 ϕ B, 17 ϕ 18
C	OSR CLOCK Ch 2	9 ϕ 13	8Hi2 ϕ C
D	LSBSQ	6 α Y	8Lo1 ϕ D
E	LSBSQ+1	6 α X	8Lo1 ϕ E
F	LSBSQ+2	6 α W	8Lo1 ϕ F
H	LSBSQ+3	6 α V	8Lo1 ϕ H
J	ADDER CARRY IN	PS	++
K	LSBSQ+4	6 α U	8Lo1 ϕ K
L	LSBSQ+5	6 α T	8Lo1 ϕ L
M	LSBSQ+6	6 α S	8Lo1 ϕ M
N	LSBSQ+7	6 α R	8Lo1 ϕ N
P	LSBSQ+8	6 α P	8Lo1 ϕ P
R	MSBSQ-8	6 α N	8Lo1 ϕ R
S	MSBSQ-7	6 α M	8Lo1 ϕ S
T	MSBSQ-6	6 α L	8Lo1 ϕ T
U	MSBSQ-5	6 α K	8Lo1 ϕ U
V	MSBSQ-4	6 α J	8Lo1 ϕ V
W	MSBSQ-3	6 α H	8Lo1 ϕ W
X	MSBSQ-2	6 α F	8Lo1 ϕ X
Y	MSBSQ-1	6 α E	8Lo1 ϕ Y
Z			

Board No. 8 Lo2, Side α

Pin	Signal Name	Origin
1	OSR-19	*
2	OSR-18	*
3	OSR-17	*
4	OSR-24	*
5	OSR-23	*
6	OSR-22	*
7	OSR-21	*
8	OSR-28	*
9	OSR-27	*
10	OSR-26	*
11	OSR-25	*
12	OSR-32	*
13	OSR-31	*
14	OSR-30	*
15	OSR-29	*
16	OSR-36(OSR CARRY OUT)	* 8Hi2 ϕ 2
17	OSR-35	*
18	OSR-34	*
19	OSR-33	*
20	ZERO	4 α 21 8Lo1 α 20, 8Hi1 α 20, 8Hi2 α 20, 17 ϕ U
21	AC2 (UPDATE)	9 α S 8Hi2 α 21
22	+12 V	PS +

Board No. 8 Lo2, Side α

Pin	Signal Name	Origin	
A			
B	MSBSQ	6 α D	8Lo1 α B
C	MSBSQ+1	6 α C	8Lo1 α C
D	MSBSQ+2	6 α B	8Lo1 α D
E	MSBSQ+3	PS	++
F	MSBSQ+4	PS	++
H	MSBSQ+5	PS	++
J	MSBSQ+6	PS	++
K	MSBSQ+7	PS	++
L	MSBSQ+8	PS	++
M	MSBSQ+9	PS	++
N	MSBSQ+10	PS	++
P	MSBSQ+11	PS	++
R	MSBSQ+12	PS	++
S	MSBSQ+13	PS	++
T	MSBSQ+14	PS	++
U	MSBSQ+15	PS	++
V	MSBSQ+16	PS	++
W	MSBSQ+17	PS	++
X	MSBSQ+18	PS	++
Y	ADDER CARRY OUT	*	8Hi2 ϕ J
Z	Digital ground	PS	+

Board No. 8 Hi2, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS \dagger
2	OSR-36	8Lo2 α 16
3		
4		
5		
6	OSR-40	*
7	OSR-39	*
8	OSR-38	*
9	OSR-37	*
10	OSR-44	*
11	OSR-43	*
12	OSR-42	*
13	OSR-41	*
14	OSR-48	*
15	OSR-47	*
16	OSR-46	*
17	OSR-45	*
18	OSR-52	*
19	OSR-51	*
20	OSR-50	*
21	OSR-49	*
22	OSR-56	*

Board No. 8 Hi2, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	OSR LOAD	9 ϕ 11 8Lo2 ϕ B, 8Hi1 ϕ B, 8Lo1 ϕ B, 17 ϕ 18
C	OSR LOAD Ch 2	9 ϕ 13 8Lo2 ϕ C
D		
E		
F		
H		
J	ADDER CARRY OUT	8Lo2 α Y
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		

Board No. 8 Hi2, Side α

Pin	Signal Name	Origin
1	OSR-55	*
2	OSR-54	*
3	OSR-53	*
4	OSR-60	*
5	OSR-59	*
6	OSR-58	*
7	OSR-57	*
8	OSR-64	*
9	OSR-63	*
10	OSR-62	*
11	OSR-61	*
12	LSB0+2 Ch 2	* 9 ϕ 15
13	LSB0+1 Ch 2	* 9 α K
14	LSB0	* 9 α D
15	OSR-65	*
16	HIGH BIT Ch 2	* 9 α 2
17	MSB0 Ch 2	* 9 ϕ U
18	MSB0-1 Ch 2	* 9 ϕ N
19	MSB0-2 Ch 2	* 9 ϕ Y
20	ZERO	4 α 21 8Lo1 α 20, 8Hi1 α 20, 8Lo2 α 20, 17 ϕ U
21	AC2 (UPDATE)	9 α S 8Lo2 α 21
22	+12 V	PS +

Board No. 8 Hi2, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
E		
F		
H		
J		
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y	ADDER OVERFLOW	*
Z	Digital ground	PS †

Board No. 9, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS +
2	UNDERFLOW Ch 1	*
3		
4		
5		
6	T $\overline{\text{SCK}}$	4 α 15
7	OS DONE Ch 2	* 11 α 15
8	OS DONE Ch 1	* 11 α 14
9	MSB-5	* 15 α 21
10	PHASE 1	* 6 ϕ T, 17 ϕ S
11	OSR LOAD	* 8Hi2 ϕ B, 8Lo2 ϕ B, 8Hi1 ϕ B, 8Lo1 ϕ B, 17 ϕ 18
12	OSR CLOCK Ch 1	* 8Hi1 ϕ C, 8Lo1 ϕ C
13	OSR CLOCK Ch 2	* 8Hi2 ϕ C, 8Lo2 ϕ C
14	LSBOT+2	4 α 4
15	LSBO+2 Ch 2	8Hi2 α 12
16	LSBO+2 Ch 1	8Hi1 α 12
17	cLSB+2	* 15 α 18
18	CHAN SEL 0	11 ϕ 17
19	CHAN SEL 1	11 ϕ 16
20		
21		
22		

Board No. 9, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	LOAD SAM	4 α W
C	MSB-1	* 15 α 10
D	T-UNDERFLOW	* 4 α 10
E	UNDERFLOW Ch 2	*
F	MSB	* 15 α 11
H	MSB-3	* 15 α 19
J	MSB-2	* 15 α 9
K	MSB-4	* 15 α 20
L		
M	MSBOT-1	4 α 2
N	MSB0-1 Ch 2	8Hi2 α 18
P	MSB0-1 Ch 1	8Hi1 α 18
R	LSB+4	* 15 α 14
S	LSB+5	* 15 α 15
T	MSB0 Ch 1	8Hi1 α 17
U	MSB0 Ch 2	8Hi2 α 17
V	MSBOT	4 α 1
W	LSB+3	* 15 α 13
X	MSB0-2 Ch 1	8Hi1 α 19
Y	MSB0-2 Ch 2	8Hi2 α 19
Z	MSBT-2	4 α 3

Board No. 9, Side α

Pin	Signal Name	Origin
1	PHASE 3	* 6 ϕ U
2	HIGH BIT Ch 2	8Hi2 α 16
3	OS ENABLE Ch 1	*
4	OS ENABLE Ch 2	*
5		
6		
7		
8		
9	ANALOG SW CONTROL	* 2 α K, 17 ϕ R
10	50 kHz	11 α 11 4 α D
11		
12	AC1	* 8Hi1 α 21, 8Lo1 α 21
13		
14		
15		
16		
17		
18	WIND TEST SWITCH	F.P. SW 23
19	100 Hz	11 α K 16 α 17, 17 α L
20	EOC	2 ϕ B
21	WINDY BUS	* 11 α U, 9 α V, 17 α K, CONN.J14 PIN 2, F.P.
22	+12 V	PS +

Board No. 9, Side α

Pin	Signal Name	Origin
A	HIGH BIT Ch 1	8Hi1 α 16
B	SINGLE	FP 15 α 8 SW 27
C	LSBOT	4 α B
D	LSBO Ch 2	8Hi2 α 14
E	LSBO Ch 1	8Hi1 α 14
F	LSB	* 15 α 16
H	LSB+1	* 15 α 17
J	LSBO+1 Ch 1	8Hi1 α 13
K	LSBO+1 Ch 2	8Hi2 α 13
L	LSBOT+1	4 α A
M	GOAD	* 2 ϕ T
N	UPDATE	4 α 18 17 α A
P	HOLD	* 2 α J
R	PHASE 5	* 4 α T, 17 ϕ T
S	AC2	* 8Hi2 α 21, 8Lo2 α 21
T	GOOD TIME	* 4 ϕ B
U	THRESH	4 ϕ 21 17 α J
V	WINDY BUS	9 α 21 11 α U, 17 α K, CONN.J14 PIN 2, F.P.
W	WIND INHIBIT	
X	WIND INPUT	FP SW 23
Y	SHIELD	CONNJ15 PIN 11 F.P. SW24
Z	Digital ground	PS +

Board No. 11, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS
2	DX0	15 ϕ 13
3	DX1	15 ϕ 11
4	DX2	15 ϕ 9
5	DX3	15 ϕ 12
6	DX4	15 ϕ 10
7	DX5	15 ϕ 8
8	DEVSEL	51 ϕ 21
9	1MHz	15 ϕ D
10	DX11	15 ϕ 2
11	DX10	15 ϕ 4
12	DX8	15 ϕ 3
13	DX7	15 ϕ 5
14	DX6	15 ϕ 7
15	DX9	15 ϕ 6
16	Ch SEL 1	*
17	Ch SEL 0	*
18	SEL CHAN	11 α 7
19	SPARE	*
20	TIN	*
21	STATIN	*
22	SAMPLEX	*

14 ϕ J, 12 ϕ 22, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J	14 ϕ J, 12 ϕ 22, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J
14 ϕ L, 12 ϕ 21, 16 α A, 17 α 12, 18 ϕ M, 19 ϕ L, 20 ϕ L	14 ϕ L, 12 ϕ 21, 16 α A, 17 α 12, 18 ϕ M, 19 ϕ L, 20 ϕ L
14 ϕ M, 12 ϕ 20, 16 α E, 17 α 11, 18 ϕ L, 19 ϕ M, 20 ϕ M	14 ϕ M, 12 ϕ 20, 16 α E, 17 α 11, 18 ϕ L, 19 ϕ M, 20 ϕ M
14 ϕ N, 12 ϕ 19, 16 α J, 17 α 10, 18 ϕ K, 19 ϕ N, 20 ϕ N	14 ϕ N, 12 ϕ 19, 16 α J, 17 α 10, 18 ϕ K, 19 ϕ N, 20 ϕ N
14 ϕ V, 12 ϕ 18, 16 α D, 17 α 9, 18 ϕ J, 19 ϕ V, 20 ϕ V	14 ϕ V, 12 ϕ 18, 16 α D, 17 α 9, 18 ϕ J, 19 ϕ V, 20 ϕ V
14 ϕ X, 12 ϕ 17, 16 α F, 17 α 8, 18 ϕ H, 19 ϕ X, 20 ϕ X	14 ϕ X, 12 ϕ 17, 16 α F, 17 α 8, 18 ϕ H, 19 ϕ X, 20 ϕ X
14 α R, 12 ϕ U, 17 α 2, 18 α D, 19 α R, 20 α R, 20 ϕ R	14 α R, 12 ϕ U, 17 α 2, 18 α D, 19 α R, 20 α R, 20 ϕ R
14 α P, 12 ϕ V, 17 α 3, 18 α C, 19 α P, 20 α P, 20 ϕ S	14 α P, 12 ϕ V, 17 α 3, 18 α C, 19 α P, 20 α P, 20 ϕ S
14 α L, 12 ϕ X, 17 α 5, 18 α A, 19 α L, 20 α L, 20 ϕ V	14 α L, 12 ϕ X, 17 α 5, 18 α A, 19 α L, 20 α L, 20 ϕ V
14 ϕ Z, 12 ϕ Y, 17 α 6, 18 ϕ E, 19 ϕ Z, 20 ϕ Z	14 ϕ Z, 12 ϕ Y, 17 α 6, 18 ϕ E, 19 ϕ Z, 20 ϕ Z
14 ϕ Y, 12 ϕ Z, 17 α 7, 18 ϕ F, 19 ϕ Y, 20 ϕ Y	14 ϕ Y, 12 ϕ Z, 17 α 7, 18 ϕ F, 19 ϕ Y, 20 ϕ Y
14 α N, 12 ϕ W, 17 α 4, 18 α B, 19 α N, 20 α N, 20 ϕ T	14 α N, 12 ϕ W, 17 α 4, 18 α B, 19 α N, 20 α N, 20 ϕ T
9 ϕ 19	9 ϕ 19
9 ϕ 18	9 ϕ 18
18 ϕ W	18 ϕ W
18 ϕ X	18 ϕ X
17 α P	17 α P

Board No. 11, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	+5 V	PS +
C	MINUTES	* 16 α 14
D	XTA	15 ϕ 20
E	XTB	15 ϕ 18
F	LXMAR	15 ϕ 19 14 α M, 12 ϕ T, 19 α M, 20 α M, 20 ϕ P
H	HDX0	* 4 ϕ C, 16 α L, 18 α 16
J	HDX1	* 4 ϕ D, 16 ϕ 4, 18 α 17
K	HDX2	* 4 ϕ E, 16 ϕ 6, 18 α 18
L	HDX3	* 4 ϕ F, 16 ϕ 5, 18 α 19
M	HDX4	* 4 ϕ H, 16 ϕ C, 18 α K
N	HDX5	* 4 ϕ J, 16 ϕ B, 18 α J
P	HDX6	* 4 ϕ K, 16 ϕ D
R	HDX7	* 4 ϕ L, 16 ϕ E
S	HDX8	* 4 ϕ T, 16 ϕ T
T	HDX9	* 4 ϕ U, 16 ϕ S
U	HDX10	* 4 ϕ V, 16 ϕ V
V	HDX11	* 4 ϕ W, 16 ϕ U
W	OUT HI	* 11 α 18
X	OUT LO	* 11 α R
Y	T OUT	* 18 ϕ V
Z	SECONDS	* 16 α 16

Board No. 11, Side α

Pin	Signal Name	Origin
1	THSET	* 4 ϕ S
2	SEC	*
3	MODE	* 16 ϕ Y, 18 α 15
4	DATA ACCEPT	*
5	HIDIS	* 16 ϕ R
6	MIN	*
7	SEL CHAN	* 11 ϕ 18
8	OUT MID	* 11 α T
9	BEGIN	* 11 α 21, 16 α 18
10	FUN HI	* 16 α B, 18 α M
11	50 kHz	* 9 α 10, 4 α D
12	TIME BASE	16 α 15
13	TS DONE	4 α N
14	Ch 1 DONE	9 ϕ 8
15	Ch 2 DONE	9 ϕ 7
16	WINDY LED	FP LI3
17	WINDY W	* CONN. J13 PIN50
18	OUT HI	11 ϕ W
19		
20	ZERO ENABLE	* 4 α V
21	BEGIN	11 α 9 16 α 18
22	+12 V	PS +

Board No. 11, Side α

Pin	Signal Name	Origin
A	OPRINT	* 11 α M
B	RTC CLEAR	* 16 α Y
C	LO DIS	* 16 ϕ 3
D	SW REG	* 15 α H
E	PEAK D	* 17 ϕ 19
F	OUTPUT D	* 15 α 12
H	FUN LO	* 15 α X
J	CT	* 15 ϕ X
K	100 Hz	* 9 α 19, 16 α 17, 17 α L
L	READ SAM	* 4 α 20
M	OPRINT	11 α A
N	PRINT	11 α N
P	L OUT LO	* 12 α 1
R	OUT LO	11 ϕ X
S	L OUT MID	* 12 α 8
T	OUT MID	11 α 8
U	WINDY BUS	9 α 21 9 α V, 17 α K, CONN. J14 PIN2
V	L OUT HI	* 12 α 15
W	DATA READY	* 15 α 2
X	SAMPLE	17 α F
Y	+5 V	PS †
Z	Digital ground	PS †

Board No. 12, Side ϕ

Pin	Signal Name	Origin
1	+5 V	PS
2	$\overline{8LO}$	*
3	$\overline{8HI}$	*
4	A9	*
5	$\overline{RSEL\ 4}$	*
6	$\overline{RSEL\ 3}$	*
7	$\overline{RSEL\ 2}$	*
8		
9		
10		
11		
12		
13		
14		
15		
16		
17	D \times 5	15 ϕ 8
18	DX4	14 ϕ X, 14 ϕ V, 11 ϕ 7, 16 α F, 17 α 8, 18 ϕ H, 19 ϕ X, 20 ϕ X
19	DX3	15 ϕ 10
20	DX2	15 ϕ 12
21	DX1	15 ϕ 9
22	DX0	15 ϕ 11
		15 ϕ 13
		14 ϕ L, 14 ϕ J, 11 ϕ 3, 16 α A, 17 α 12, 19 ϕ M, 19 ϕ L, 20 ϕ L
		14 ϕ J, 11 ϕ 2, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J
		14 ϕ X, 14 ϕ V, 11 ϕ 6, 16 α D, 17 α 9, 18 ϕ J, 19 ϕ V, 20 ϕ V
		14 ϕ N, 11 ϕ 5, 16 α J, 17 α 10, 18 ϕ K, 19 ϕ N, 20 ϕ N
		14 ϕ M, 11 ϕ 4, 16 α E, 17 α 11, 18 ϕ L, 19 ϕ M, 20 ϕ M
		14 ϕ L, 11 ϕ 3, 16 α A, 17 α 12, 19 ϕ M, 19 ϕ L, 20 ϕ L
		14 ϕ J, 11 ϕ 2, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J

Board No. 12, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS
B	XTC	15 ϕ 17
C		14 ϕ K, 19 ϕ K, 20 ϕ K
D	FIELD 0	18 α Y
E	A9	14 ϕ W
F	ROM A8	15 ϕ H
H	ROM A7	18 ϕ 21, 20 ϕ 20
J	ROM A6	15 ϕ V, 18 ϕ 20, 20 ϕ 19
K	ROM A5	15 ϕ U, 18 ϕ 19, 20 ϕ 18
L	ROM A4	15 ϕ T, 18 ϕ 18, 20 ϕ 17
M	ROM A3	15 ϕ S, 18 ϕ 17, 20 ϕ 16
N	ROM A2	15 ϕ R, 18 ϕ 16, 20 ϕ 15
P	ROM A1	15 ϕ P, 18 ϕ 15, 20 ϕ 14
R	ROM A0	15 ϕ N, 18 ϕ 14, 20 ϕ 13
S		15 ϕ M, 18 ϕ 13, 20 ϕ 12
T	LXMAR	15 ϕ 19
U	DX11	14 α M, 11 ϕ F, 19 α M, 20 α M, 20 ϕ P
V	DX10	15 ϕ 2
W	DX9	14 α R, 11 ϕ 10, 17 α 2, 18 α D, 19 α R, 20 α R, 20 ϕ R
X	DX8	15 ϕ 4
Y	DX7	14 α P, 11 ϕ 11, 17 α 3, 18 α C, 19 α P, 20 α P, 20 ϕ S
Z	DX6	15 ϕ 6
		14 α N, 11 ϕ 15, 17 α 4, 18 α B, 19 α N, 20 α N, 20 ϕ T
		15 ϕ 3
		14 α L, 11 ϕ 12, 17 α 5, 18 α A, 19 α L, 20 α L, 20 ϕ V
		15 ϕ 5
		14 ϕ Z, 11 ϕ 13, 17 α 6, 18 ϕ E, 19 ϕ Z, 20 ϕ Z
		15 ϕ 7
		14 ϕ Y, 11 ϕ 14, 17 α 7, 18 ϕ F, 19 ϕ Y, 20 ϕ Y

Board No. 12, Side α

Pin	Signal Name	Origin
1	LOUT LO	11 α P
2	PIO 29	* CONN J13 PIN 16
3	PIO 26	* CONN J13 PIN 25
4	PIO 28	* CONN J13 PIN 35
5	PIO 33	* CONN J13 PIN 44
6	PIO 35	* CONN J13 PIN 33
7	PIO 30	* CONN J13 PIN 30
8	LOUT MID	11 α S
9	PIO 17	* CONN J13 PIN 7
10	PIO 14	* CONN J13 PIN 4
11	PIO 16	* CONN J13 PIN 20
12	PIO 21	* CONN J13 PIN 46
13	PIO 23	* CONN J13 PIN 42
14	PIO 18	* CONN J13 PIN 22
15	LOUT HI	11 α V
16	PIO 5	* CONN J13 PIN 39
17	PIO 2	* CONN J13 PIN 13
18	PIO 4	* CONN J13 PIN 24
19	PIO 9	* CONN J13 PIN 14
20	PIO 11	* CONN J13 PIN 23
21	PIO 6	* CONN J13 PIN 11
22	+5 V	PS †

Board No. 12, Side α

Pin	Signal Name	Origin
A		
B		
C		
D	PIO 32	* CONN J13 PIN 21
E	PIO 36	* CONN J13 PIN 31
F	PIO 34	* CONN J13 PIN 6
H	PIO 25	* CONN J13 PIN 5
J	PIO 27	* CONN J13 PIN 1
K	PIO 31	* CONN J13 PIN 10
L	PIO 20	* CONN J13 PIN 18
M	PIO 24	* CONN J13 PIN 49
N	PIO 22	* CONN J13 PIN 40
P	PIO 13	* CONN J13 PIN 9
R	PIO 15	* CONN J13 PIN 2
S	PIO 19	* CONN J13 PIN 27
T	PIO 8	* CONN J13 PIN 3
U	PIO 12	* CONN J13 PIN 43
V	PIO 10	* CONN J13 PIN 12
W	PIO 1	* CONN J13 PIN 34
X	PIO 3	* CONN J13 PIN 45
Y	PIO 7	* CONN J13 PIN 38
Z	Digital	PS †

Board No. 14, Side ϕ

Pin	Signal Name	Origin
1	+5	PS +

Board No. 14, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B		
C		
D		
E		
F		
G		
H		
J		
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		
DX0		15 ϕ 13 12 ϕ 22, 11 ϕ 2, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J
XTC		15 ϕ 17 12 ϕ B, 19 ϕ K, 20 ϕ K
DX1		15 ϕ 11 12 ϕ 21, 11 ϕ 3, 16 α A, 17 α 12, 18 ϕ M, 19 ϕ L, 20 ϕ L
DX2		15 ϕ 9 12 ϕ 20, 11 ϕ 4, 16 α E, 17 α 11, 18 ϕ L, 19 ϕ M, 20 ϕ M
DX3		15 ϕ 12 12 ϕ 19, 11 ϕ 5, 16 α J, 17 α 10, 18 ϕ K, 19 ϕ N, 20 ϕ N
DX4		
FIELD 0		
DX5		15 ϕ 10 12 ϕ 18, 11 ϕ 6, 16 α D, 17 α 9, 18 ϕ J, 19 ϕ V, 20 ϕ V
DX6		18 α 4 12 ϕ D
DX7		15 ϕ 8 12 ϕ 17, 11 ϕ 7, 16 α F, 17 α 8, 18 ϕ H, 19 ϕ X, 20 ϕ X
		15 ϕ 7 12 ϕ Z, 11 ϕ 14, 17 α 7, 18 ϕ F, 19 ϕ Y, 20 ϕ Y
		15 ϕ 5 12 ϕ Y, 11 ϕ 13, 17 α 6, 18 ϕ E, 19 ϕ Z, 20 ϕ Z

Board No. 14, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22	+5	PS +

Board No. 14, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
E		
F		
H		
J		
K		
L	DX8	15 ϕ 3
M	LXWAR	15 ϕ 19
N	DX9	15 ϕ 6
P	DX10	15 ϕ 4
R	DX11	15 ϕ 2
S		
T		
U		
V		
W		
X		
Y		
Z		
	Digital ground	PS
		+

Board No. 15, Side ϕ

Pin	Signal Name	Origin	
1	+5 V	PS	+
2	DX11	*	14 α R, 12 ϕ U, 11 ϕ 10, 17 α 2, 18 α D, 19 α R, 20 α R, 20 ϕ R
3	DX8	*	14 α L, 12 ϕ X, 11 ϕ 12, 17 α 5, 18 α A, 19 α L, 20 α L, 20 ϕ V
4	DX10	*	14 α P, 12 ϕ V, 11 ϕ 11, 17 α 3, 18 α C, 19 α P, 20 α P, 20 ϕ S
5	DX7	*	14 ϕ Z, 12 ϕ Y, 11 ϕ 13, 17 α 6, 18 ϕ E, 19 ϕ Z, 20 ϕ Z
6	DX9	*	14 α N, 12 ϕ W, 11 ϕ 15, 17 α 4, 18 α B, 19 α N, 20 α N, 20 ϕ T
7	DX6	*	14 ϕ Y, 12 ϕ Z, 11 ϕ 14, 17 α 7, 18 ϕ F, 19 ϕ Y, 20 ϕ Y
8	DX5	*	14 ϕ X, 12 ϕ 17, 11 ϕ 7, 16 α F, 17 α 8, 18 ϕ H, 19 ϕ X, 20 ϕ X
9	DX2	*	14 ϕ M, 12 ϕ 20, 11 ϕ 4, 16 α E, 17 α 11, 18 ϕ L, 19 ϕ M, 20 ϕ M
10	DX4	*	14 ϕ V, 12 ϕ 18, 11 ϕ 6, 16 α D, 17 α 9, 18 ϕ J, 19 ϕ V, 20 ϕ V
11	DX1	*	14 ϕ L, 12 ϕ 21, 11 ϕ 3, 16 α A, 17 α 12, 18 ϕ M, 19 ϕ L, 20 ϕ L
12	DX3	*	14 ϕ N, 12 ϕ 19, 11 ϕ 5, 16 α J, 17 α 10, 18 ϕ K, 19 ϕ N, 20 ϕ N
13	DX0	*	14 ϕ J, 12 ϕ 22, 11 ϕ 2, 16 α H, 17 α 13, 18 ϕ N, 19 ϕ J, 20 ϕ J
14	A9	12 ϕ 4	
15	FEICH	*	
16	.5MHz Clock Input	15 ϕ C	
17	XTC	*	14 ϕ K, 12 ϕ B, 19 ϕ K, 20 ϕ K
18	XTB	*	11 ϕ E
19	LXMAR	*	14 α M, 12 ϕ T, 11 ϕ F, 19 α M, 20 α M, 20 ϕ P
20	XTA	*	11 ϕ D
21	DEVSEL	*	11 ϕ 8
22		*	

Board No. 15, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	4 MHz	*
C	0.5 MHz	* 15 ϕ 16
D	1 MHz	* 11 ϕ 9
E	SKP	*
F	CP REQUEST	PS(+5V) to +5 supply
H	A9	12 ϕ E
J	8LO	12 ϕ 2
K	-9 V	PS From separate 9v supply. Used only
L	8HI	12 ϕ 3 if U1 thru U6 installed.
M	ROM A0	12 ϕ R 18 ϕ 13, 20 ϕ 12
N	ROM A1	12 ϕ P 18 ϕ 14, 20 ϕ 13
P	ROM A2	12 ϕ N 18 ϕ 15, 20 ϕ 14
R	ROM A3	12 ϕ M 18 ϕ 16, 20 ϕ 15
S	ROM A4	12 ϕ L 18 ϕ 17, 20 ϕ 16
T	ROM A5	12 ϕ K 18 ϕ 18, 20 ϕ 17
U	ROM A6	12 ϕ J 18 ϕ 19, 20 ϕ 18
V	ROM A7	12 ϕ H 18 ϕ 20, 20 ϕ 19
W	SWSEL	*
X	CT	11 α J
Y	MEMSEL	* 18 α 20
Z	BIT 0	FP SW 1

Board No. 15, Side α

Pin	Signal Name	Origin
1	CPSEL	*
2	DATA READY	11 α W
3	RTC	16 α U
4	PSEL 2	CONN J13 PIN 47
5	SHIFT F	FP
6	DATA REQUEST	SW 13
7	KEY START	CONN J13
8	SINGLE	PIN 15
9	MSB-2	17 α U
10	MSB-1	FP
11	MSB	SW 27 9 α B
12	OUTPUT D	9 ϕ J
13	LSB+3	9 ϕ C
14	LSB+4	9 ϕ F
15	LSB+5	11 α F
16	LSB	9 ϕ W
17	LSB+1	9 ϕ R
18	LSB+2	9 ϕ S
19	MSB-3	9 α F
20	MSB-4	9 α H
21	MSB-5	9 ϕ 17
22	+5 V	9 ϕ H
		9 ϕ K
		9 ϕ 9
		PS +

Board No. 15, Side α

Pin	Signal Name	Origin
A	DATA F	* 18 α L
B	BIT 1	FP
		SW 2
C	BIT 2	FP
		SW 3
D	BIT 7	FP
		SW 8
E	BIT 6	FP
		SW 7
F	BIT 8	FP
		SW 9
H	SW REG	11 α D
J	BIT 3	FP
		SW 4
K	BIT 4	FP
		SW 5
L	BIT 11	FP
		SW 12
M	BIT 10	FP
		SW 11
N	BIT 9	FP
		SW 10
P	BIT 5	FP
		SW 6
R	THF	17 α V
S	SEL/LEQ	FP
		SW 15
T	PSEL 1	J13
		PIN 8
U		
V	KEY PRINT	CONN J13
		PIN 19
W	KEY SAMPLE	17 α E
X	FUNLO	11 α H
Y	+12 V	PS +
Z	Digital	PS +

Board No. 16, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS +
2	+5 V	PS +
3	LODIS	11 α C
4	HDX1	11 ϕ J 4 ϕ D, 18 α 17
5	HDX3	11 ϕ L 4 ϕ F, 18 α 19
6	HDX2	11 ϕ K 4 ϕ E, 18 α 18
7	MSBD-2	* 21-11
8	MSBD	* 21-9
9	LSBD+5	* 21-14
10	LSBD+7	* 21-16
11	LSBD+1	* 21-19
12	LSBD+3	* 21-21
13	MSBD-6	* 21-6
14	MSBD-4	* 21-4
15	MSBDDP	* 21-8
16	LSBDDP	* 21-22
17	POS 13	* FP SW 18
18	POS 14	* FP SW 18
19	POS 15	* FP SW 18
20	POS 16	* FP SW 18
21	POS 9	* FP SW 18
22	POS 10	* FP SW 18

Board No. 16, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B	HDX5	11 ϕ N 4 ϕ J, 18 α J
C	HDX4	11 ϕ M 4 ϕ H, 18 α K
D	HDX6	11 ϕ P 4 ϕ K
E	HDX7	11 ϕ R 4 ϕ L
F	MSBD-7	* 21-7
H	MSBD-5	* 21-5
J	LSBD	* 21-13
K	LSBD+2	* 21-20
L	LSBD+4	* 21-18
M	LSBD+6	* 21-15
N	MSBD-3	* 21-2
P	MSBD-1	* 21-10
R	HI DIS	11 α 5
S	HDX9	11 ϕ T 4 ϕ U
T	HDX8	11 ϕ S 4 ϕ T
U	HDX11	11 ϕ V 4 ϕ W
V	4DX10	11 ϕ U 4 ϕ V
W	LSBDDP+1	* 21-17
X	MSBDDP-1	* 21-3
Y	MODE	11 α 3 18 α 15
Z	STAND-BY LED	* FP L1

Board No. 16, Side α

Pin	Signal Name	Origin
1	POS 11	FP
		SW 18
2	POS 12	FP
		SW 18
3	POS 5	FP
		SW 18
4	POS 6	FP
		SW 18
5	POS 7	FP
		SW 18
6	POS 8	FP
		SW 18
7	POS 1	FP
		SW 18
8	POS 2	FP
		SW 18
9	POS 3	FP
		SW 18
10	POS 4	FP
		SW 18
11	START LED	* FP
		L12
12	PEAK CHANNEL	* 17 ϕ P
13	V DISPLAY	* FP
		SW 16, 21-1
14	MINUTES	11 ϕ C
15	TIME BASE	* 11 α 12
16	SECONDS	11 ϕ Z
17	100 Hz	11 α K 9 α 19, 17 α L
18	BEGIN	11 α 9 11 α 21
19		
20		
21	+5	PS +
22	+12	PS +

Board No. 16, Side α

Pin	Signal Name	Origin
A	DX1	15φ11
B	FUNHI	11α10
C	F4	FP
		SW 17
D	DX4	15φ10
E	DX2	15φ9
F	DX5	15φ8
H	DX0	15φ13
J	DX3	15φ12
K	EXECUTE FUNCTION	*
L	HDX0	11φH
M	TO MIC CAL RELAY	*
N	+12 V Ext Batt	CONN J16
	(Red No. 18	PIN 1
	gauge)	
P	Minitape Relay Hi	*
R	+12 V P.S. (Red No. 18)	PS
S	Minitape Relay Lo	*
T	On/off Switch	PS
	(Red No. 18)	SW 28
U	RTC	*
V	+12 V Int. (Gray Batt. No. 18)	PS
W	+15 V (Orange No. 18)	PS
X	Ground from Ext.Batt.	PS
	Digital P.S.	
	(Black No. 18)	
Y	RTC Clear	11αB
Z	Digital ground	PS +

Board No. 17, Side ϕ

Pin	Signal Name	Origin
1	12 V	PS +
2	5 V	PS +
3	A ₀	6 ϕ P 4 ϕ 20, 4 α X, 2 α C
4	A ₁	6 ϕ J 4 ϕ Y, 4 α Y, 2 α B
5	A ₂	6 ϕ F 4 ϕ X, 4 α R, 2 α A
6	PEAK 11	*
7	PEAK 10	*
8	PEAK 9	*
9	PEAK 8	*
10	PEAK 7	*
11	PEAK 6	*
12	PEAK 5	*
13	PEAK 4	*
14	PEAK 3	*
15	PEAK 2	*
16	PEAK 1	*
17	PEAK 0	*
18	OSR LOAD	9 ϕ 11 8 Hi2 ϕ B, 8 Lo2 ϕ B, 8 Hi1 ϕ B, 8 Lo1 ϕ B
19	PEAK D	11 α E
20		
21		
22		

Board No. 17, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	+
B			
C	MSB	2 ϕ C	4 ϕ 19, 6 ϕ R
D	MSB-1	2 ϕ D	4 ϕ Z, 6 ϕ N
E	MSB-2	2 ϕ H	4 ϕ M, 6 ϕ M
F	MSB-3	2 ϕ F	4 ϕ N, 6 ϕ B
H	MSB-4	2 ϕ E	4 ϕ P, 6 ϕ C
J	LSB+4	2 ϕ L	4 ϕ R, 6 ϕ L
K	LSB+3	2 ϕ K	4 ϕ 3, 6 ϕ K
L	LSB+2	2 ϕ J	4 ϕ 4, 6 ϕ D
M	LSB+1	2 ϕ M	4 ϕ 5, 6 ϕ E
N	LSB	2 ϕ N	4 ϕ 6, 6 ϕ H
P	PEAK CHAN	16 α 12	
R	ANALOG SWITCH	9 α 9	2 α K
S	PHASE 1	9 ϕ 10	6 ϕ T
T	PHASE 5	9 α R	4 α T
U	ZERO	4 α 21	8 Lo1 α 20, 8 Hi1 α 20, 8 Hi2 α 20, 8 Lo2 α 20
V			
W			
X			
Y			
Z			

Board No. 17, Side α

Pin	Signal Name	Origin
1		
2	DX11	15 ϕ 2
3	DX10	15 ϕ 4
4	DX9	15 ϕ 6
5	DX8	15 ϕ 3
6	DX7	15 ϕ 5
7	DX6	15 ϕ 7
8	DX5	15 ϕ 8
9	DX4	15 ϕ 10
10	DX3	15 ϕ 12
11	DX2	15 ϕ 9
12	DX1	15 ϕ 11
13	DX0	15 ϕ 13
14		
15		
16		
17		
18		
19		
20		
21	+5	PS
22	+12	PS

14 α R, 12 ϕ U, 11 ϕ 10, 18 α D, 19 α R, 20 α R, 20 ϕ R
 14 α P, 12 ϕ V, 11 ϕ 11, 18 α C, 19 α P, 20 α P, 20 ϕ S
 14 α N, 12 ϕ W, 11 ϕ 15, 18 α B, 19 α N, 20 α N, 20 ϕ T
 14 α L, 12 ϕ X, 11 ϕ 12, 18 α A, 19 α L, 20 α L, 20 ϕ V
 14 ϕ Z, 12 ϕ Y, 11 ϕ 13, 18 ϕ E, 19 ϕ Z, 20 ϕ Z
 14 ϕ Y, 12 ϕ Z, 11 ϕ 14, 18 ϕ F, 19 ϕ Y, 20 ϕ Y
 14 ϕ X, 12 ϕ 17, 11 ϕ 7, 16 α F, 19 ϕ X, 20 ϕ X
 14 ϕ V, 12 ϕ 18, 11 ϕ 6, 16 α D, 18 ϕ J, 19 ϕ V, 20 ϕ V
 14 ϕ N, 12 ϕ 19, 11 ϕ 5, 10 α J, 18 ϕ K, 19 ϕ N, 20 ϕ N
 14 ϕ M, 12 ϕ 20, 11 ϕ 4, 16 α E, 18 ϕ L, 19 ϕ M, 20 ϕ M
 14 ϕ L, 12 ϕ 21, 11 ϕ 3, 16 α A, 18 ϕ M, 19 ϕ L, 20 ϕ L
 14 ϕ J, 12 ϕ 22, 11 ϕ 2, 16 α H, 18 ϕ N, 19 ϕ J, 20 ϕ J

Board No. 17, Side α

Pin	Signal Name	Origin
A	UPDATE	4 α 18 9 α N
B	MODE 3	18 α 9
C	MODE 4	18 α 11
D	T ZERO	* 4 α 6
E	KEY SAMPLE	* 15 α W
F	SAMPLE	* 11 α X
H	SAMPLE TRIG	* FP SW 22, FP J1
J	THRESH	4 ϕ 21 9 α U
K	WINDY BUS	9 α 21 11 α U, 9 α V
L	100 Hz	11 α K 9 α 19, 16 α 17
M	K SAMPLE	* FP SW 21
N	K SAMPLE	* FP SW 21
P	SAMPLEX	11 ϕ 22
R	K START	* FP SW 20
S	K START	* FP SW 20
T	START TRIG	* FP J2, FP SW 22
U	KEY START	* 15 α 7
V	THF	* 15 α R
W	THRESH UP	* FP SW 22
X	THRESH DOWN	* FP SW 22
Y		
Z	Digital ground	PS +

Board No. 18, Side ϕ

Pin	Signal Name	Origin	
1	+12	PS	+
2	+5	PS	+
3	DX7 (RBR8)	*	
4	DX6 (RBR7)	*	
5	DX5 (RBR6)	*	
6	DX4 (RBR5)	*	
7	DX3 (RBR4)	*	
8	DX2 (RBR3)	*	
9	DX1 (RBR2)	*	
10	DX0 (RBR1)	*	
11	RXC	*	
12	19.2 kHz	*	
13	ROM A0	12 ϕ R	15 ϕ M, 20 ϕ 12
14	ROM A1	12 ϕ P	15 ϕ N, 20 ϕ 13
15	ROM A2	12 ϕ N	15 ϕ P, 20 ϕ 14
16	ROM A3	12 ϕ M	15 ϕ R, 20 ϕ 15
17	ROM A4	12 ϕ L	15 ϕ S, 20 ϕ 16
18	ROM A5	12 ϕ K	15 ϕ T, 20 ϕ 17
19	ROM A6	12 ϕ J	15 ϕ U, 20 ϕ 18
20	ROM A7	12 ϕ H	15 ϕ V, 20 ϕ 19
21	ROM A8	12 ϕ F	20 ϕ 20
22			

Board No. 18, Side ϕ

Pin	Signal Name	Origin	+
A	Digital ground	PS	
B	Relay Coil (ground to activate)	*	
C	Relay Contact Hi	*	
D	Relay Contact Lo	*	
E	DX7 (TBR8)	15 ϕ 5	14 ϕ Z, 12 ϕ Y, 11 ϕ 13, 17 α 6, 19 ϕ Z, 20 ϕ Z
F	DX6 (TBR7)	15 ϕ 7	14 ϕ Y, 12 ϕ Z, 11 ϕ 14, 17 α 7, 19 ϕ Y, 20 ϕ Y
H	DX5 (TBR6)	15 ϕ 8	14 ϕ X, 12 ϕ 17, 11 ϕ 7, 16 α F, 17 α 8, 19 ϕ X, 20 ϕ X
J	DX4 (TBR5)	15 ϕ 10	14 ϕ V, 12 ϕ 18, 11 ϕ 6, 16 α D, 17 α 9, 19 ϕ V, 20 ϕ V
K	DX3 (TBR4)	15 ϕ 12	14 ϕ N, 12 ϕ 19, 11 ϕ 5, 16 α J, 17 α 10, 19 ϕ N, 20 ϕ N
L	DX2 (TBR3)	15 ϕ 9	14 ϕ M, 12 ϕ 20, 11 ϕ 4, 16 α E, 17 α 11, 19 ϕ M, 20 ϕ M
M	DX1 (TBR2)	15 ϕ 11	14 ϕ L, 12 ϕ 21, 11 ϕ 3, 16 α A, 17 α 12, 19 ϕ L, 20 ϕ L
N	DX0 (TBR1)	15 ϕ 13	14 ϕ J, 12 ϕ 22, 11 ϕ 2, 16 α H, 17 α 13, 19 ϕ J, 20 ϕ J
P	DR	*	
R	TBRE	*	
S	PE	*	
T	FE	*	
U	OE	*	
V	TOUT	11 ϕ Y	
W	TIN	11 ϕ 20	
X	STATIN	11 ϕ 21	
Y	CASSETTE IN	FP	
Z	CASSETTE OUT	J3	FP
		*	J11

Board No. 18, Side α

Pin	Signal Name	Origin
1	M11	*
2	M10	*
3	M9	* FP L11
4	M8	* FP L10
5	M7	* FP L9
6	M6	* FP L8
7	M5	* FP L7
8	M4	* FP L6
9	MODE 3	* 17 α B
10	M3	* FP L5
11	MODE 4	* 17 α C
12	M2	* FP L4
13	M1	* FP L3
14	M0	* FP L2
15	MODE	11 α 3 16 ϕ Y
16	HDX0	11 ϕ H 4 ϕ C, 16 α L
17	HDX1	11 ϕ J 4 ϕ D, 16 ϕ 4
18	HDX2	11 ϕ K 4 ϕ E, 16 ϕ 6
19	HDX3	11 ϕ L 4 ϕ F, 16 ϕ 5
20	MEMSEL	15 ϕ Y
21	+5 V	PS †
22	+12 V	PS †

Board No. 18, Side α

Pin	Signal Name	Origin
A	DX8	15φ3
B	DX9	15φ6
C	DX10	15φ4
D	DX11	15φ2
E	RSEL 4	12φ5
F	RSEL 3	12φ6
H	RSEL 2	12φ7
J	HDX5	11φN
K	HDX4	11φM
L	DATA F	15αA
M	FUNHI	11α10
N	LSBSN	16αB
P	LSBSN +1	*
R	LSBSN +2	*
S	MSBSN -2	*
T	MSBSN -1	*
U	MSBSN	*
V	FIELD 3	*
W	FIELD 2	*
X	FIELD 1	*
Y	FIELD 0	*
Z	Digital ground	PS

Serial number for each unit in one's complement binary
(Same as stamped on front panel)

20φW
19φW
14φW, 12φD
+

Board No. 19, Side ϕ

Pin	Signal Name	Origin
1	+5	PS +
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Board No. 19, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS +
B		
C		
D		
E		
F		
H		
J		
K	DX0	15 ϕ 13 12 ϕ 22, 11 ϕ 2, 16 α H, 17 α 13, 18 ϕ N, 20 ϕ J
L	XTC	15 ϕ 17 12 ϕ B, 20 ϕ K
M	DX1	15 ϕ 11 12 ϕ 21, 11 ϕ 3, 16 α A, 17 α 12, 18 ϕ M, 20 ϕ L
N	DX2	15 ϕ 9 12 ϕ 20, 11 ϕ 4, 16 α E, 17 α 11, 18 ϕ L, 20 ϕ M
P	DX3	15 ϕ 12 12 ϕ 19, 11 ϕ 5, 16 α J, 17 α 10, 18 ϕ K, 20 ϕ N
R		
S		
T		
U		
V		
W	DX4	15 ϕ 10 12 ϕ 18, 11 ϕ 6, 16 α D, 17 α 9, 18 ϕ J, 20 ϕ V
X	FIELD 1	18 α X
Y	DX5	15 ϕ 8 12 ϕ 17, 11 ϕ 7, 16 α F, 17 α 8, 18 ϕ H, 20 ϕ X
Z	DX6	15 ϕ 7 12 ϕ Z, 11 ϕ 14, 17 α 7, 18 ϕ F, 20 ϕ Y
	DX7	15 ϕ 5 12 ϕ Y, 11 ϕ 13, 17 α 6, 18 ϕ E, 20 ϕ Z

Board No. 19, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22	+5	PS +

Board No. 19, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
E		
F		
H		
J		
K		
L	DX8	15 ϕ 3
M	LXMAR	15 ϕ 19
N	DX9	15 ϕ 6
P	DX10	15 ϕ 4
R	DX11	15 ϕ 2
S		12 ϕ X, 11 ϕ 12, 17 α 5, 18 α A, 20 α L, 20 ϕ V
T		12 ϕ T, 11 ϕ F, 20 α M, 20 ϕ P
U		12 ϕ W, 11 ϕ 15, 17 α 4, 18 α B, 20 α N, 20 ϕ T
V		12 ϕ V, 11 ϕ 11, 17 α 3, 18 α C, 20 α P, 20 ϕ S
W		12 ϕ U, 11 ϕ 10, 17 α 2, 18 α D, 20 α R, 20 ϕ R
X		
Y		
Z	Digital ground	PS +

Board No. 20, Side ϕ

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12	ROM A0	12 ϕ R 15 ϕ M, 18 ϕ 13
13	ROM A1	12 ϕ P 15 ϕ N, 18 ϕ 14
14	ROM A2	12 ϕ N 15 ϕ P, 18 ϕ 15
15	ROM A3	12 ϕ M 15 ϕ R, 18 ϕ 16
16	ROM A4	12 ϕ L 15 ϕ S, 18 ϕ 17
17	ROM A5	12 ϕ K 15 ϕ T, 18 ϕ 18
18	ROM A6	12 ϕ J 15 ϕ U, 18 ϕ 19
19	ROM A7	12 ϕ H 15 ϕ V, 18 ϕ 20
20	ROM A8	12 ϕ F 18 ϕ 21
21		
22		

Board No. 20, Side ϕ

Pin	Signal Name	Origin
A	Digital ground	PS
B		
C		
D		
E		
F		
H		
J		
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		
	DX0	15 ϕ 13
	XTC	15 ϕ 17
	DX1	15 ϕ 11
	DX2	15 ϕ 9
	DX3	15 ϕ 12
	LXMAR	15 ϕ 19
	DX11	15 ϕ 2
	DX10	15 ϕ 4
	DX9	15 ϕ 6
	DX8	15 ϕ 3
	DX4	15 ϕ 10
	FIELD 2	18 ϕ W
	DX5	15 ϕ 8
	DX6	15 ϕ 7
	DX7	15 ϕ 5
		14 ϕ J, 12 ϕ 22, 11 ϕ 2, 16 α H, 17 α 13, 19 ϕ J, 18 ϕ N
		14 ϕ K, 19 ϕ K, 12 ϕ B
		14 ϕ L, 12 ϕ 21, 11 ϕ 3, 16 α A, 17 α 12, 19 ϕ L, 18 ϕ M
		14 ϕ M, 12 ϕ 20, 11 ϕ 4, 16 α E, 17 α 11, 19 ϕ M, 18 ϕ L
		14 ϕ N, 12 ϕ 19, 11 ϕ 5, 16 α J, 17 α 10, 19 ϕ N, 18 ϕ K
		14 α M, 11 ϕ F, 19 α M, 12 ϕ T, 20 α M
		14 α R, 12 ϕ U, 11 ϕ 10, 17 α 2, 19 α R, 20 α R, 18 α D
		14 α P, 12 ϕ V, 11 ϕ 11, 17 α 3, 19 α P, 20 α P, 18 α C
		14 α N, 12 ϕ W, 11 ϕ 15, 17 α 4, 19 α N, 20 α N, 18 α B
		14 α L, 12 ϕ X, 11 ϕ 12, 17 α 5, 19 α L, 20 α L, 18 α A
		14 ϕ V, 12 ϕ 18, 11 ϕ 6, 16 α D, 17 α 9, 19 ϕ V, 18 ϕ J
		14 ϕ X, 12 ϕ 17, 11 ϕ 7, 16 α F, 17 α 8, 19 ϕ X, 18 ϕ H
		14 ϕ Y, 12 ϕ Z, 11 ϕ 14, 17 α 7, 19 ϕ Y, 18 ϕ F
		14 ϕ Z, 12 ϕ Y, 11 ϕ 13, 17 α 6, 19 ϕ Z, 18 ϕ E

Board No. 20, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22	+5	PS +

Board No. 20, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
E		
F		
H		
J		
K		
L	DX8	15 ϕ 3
M	LXWAR	15 ϕ 19
N	DX9	15 ϕ 6
P	DX10	15 ϕ 4
R	DX11	15 ϕ 2
S		12 ϕ X, 11 ϕ 12, 17 α 5, 18 α A, 19 α L, 14 α L, 20 ϕ U
T		12 ϕ T, 11 ϕ F, 19 α M, 14 α M, 20 ϕ P
U		12 ϕ W, 11 ϕ 15, 17 α 4, 18 α B, 19 α N, 14 α N, 20 ϕ T
V		12 ϕ V, 11 ϕ 11, 17 α 3, 18 α C, 19 α P, 14 α P, 20 ϕ S
W		12 ϕ U, 11 ϕ 10, 17 α 2, 18 α D, 19 α R, 14 α R, 20 ϕ R
X		
Y		
Z		
	Digital ground	PS
		+

Board No. 21

Pin	Signal Name	Origin
1	VOISPLAY	16α13
2	MSBD-3	16φN
3	MSBDDP-1	16φX
4	MSBD-4	16φ14
5	MSBD-5	16φH
6	MSBD-6	16φ13
7	MSBD-7	16φF
8	MSBDDP	16φ15
9	MSBD	16φ8
10	MSBD-1	16φP
11	MSBD-2	16φ7
12		
13	LSBD	16φJ
14	LSBD+5	16φ9
15	LSBD+6	16φM
16	LSBD+7	16φ10
17	LSBDDP+1	16φW
18	LSBD+4	16φL
19	LSBD+1	16φ11
20	LSBD+2	16φK
21	LSBD+3	16φ12
22	LSBDDP	16φ16

AD-A072 002

CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 13/2
TRUE-INTEGRATING ENVIRONMENTAL NOISE MONITOR AND SOUND EXPOSURE--ETC(U)
JUN 79 A J AVERBUCH, P D SCHOMER

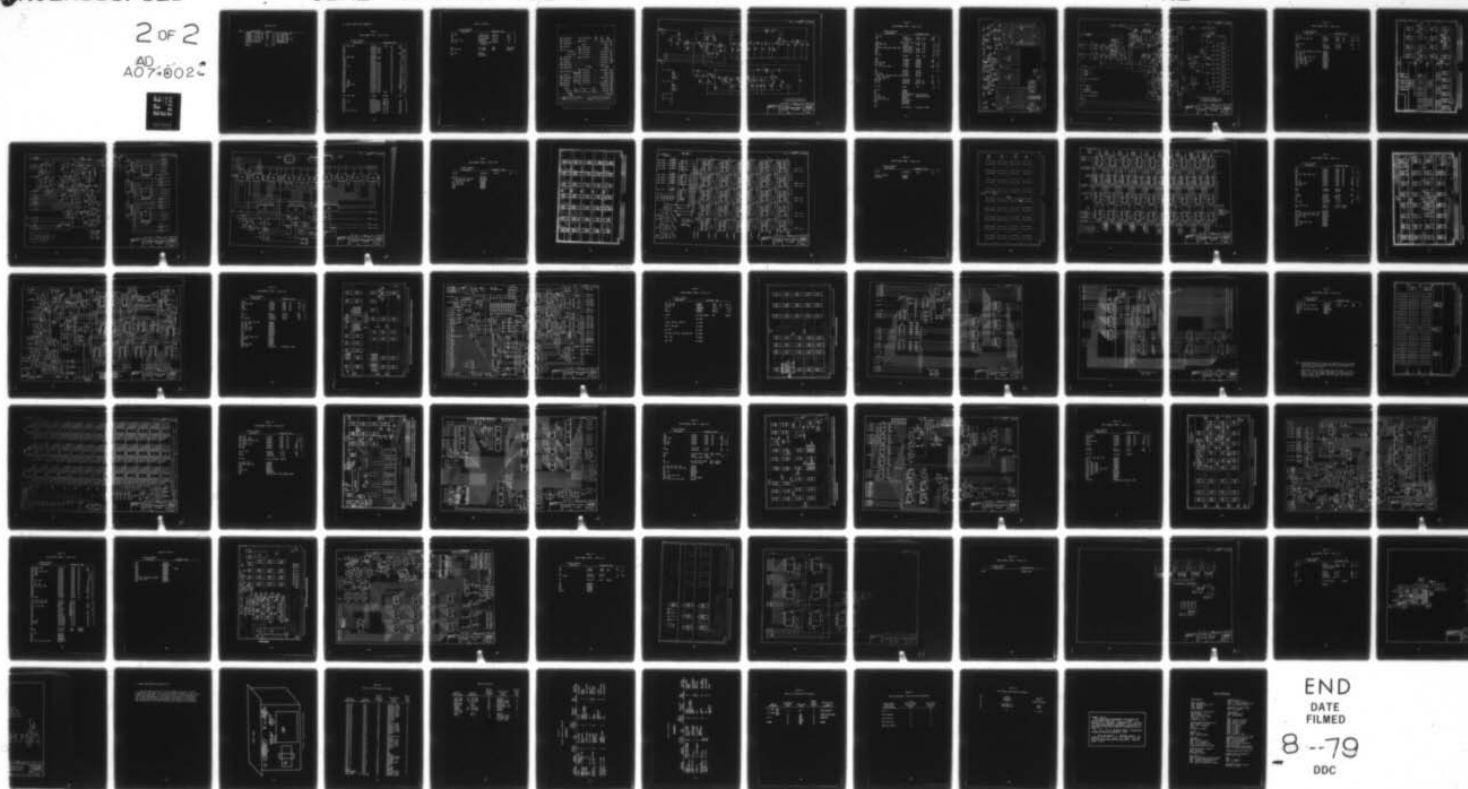
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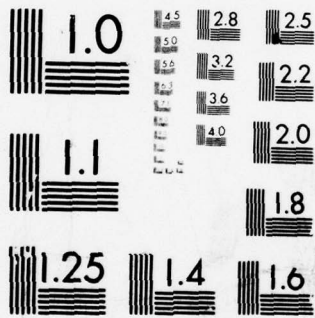
2 OF 2

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A07-002



END
DATE
FILMED

8-79
DOC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Board No. 22

Pin	Signal Name	Origin
	CHANNEL 1 FILTER OUT	1φU F.P. CH1 FILTEROUT BNC
	CHANNEL 1 FILTER IN	1φD F.P. CH1 INPUT BNC
	CHANNEL 2 FILTER IN	1αD F.P. CH2 INPUT BNC
	CHANNEL 2 FILTER OUT	1αU F.P. CH2 FILTER OUT BNC
	Headphone Amp OUT +	* F.P. HEADPHONE BNC
	Headphone Amp OUT -	* F.P. HEADPHONE BNC
	12 V	P.S. F.P.
	Ground	P.S. F.P.

6 PARTS LAYOUTS AND SCHEMATICS

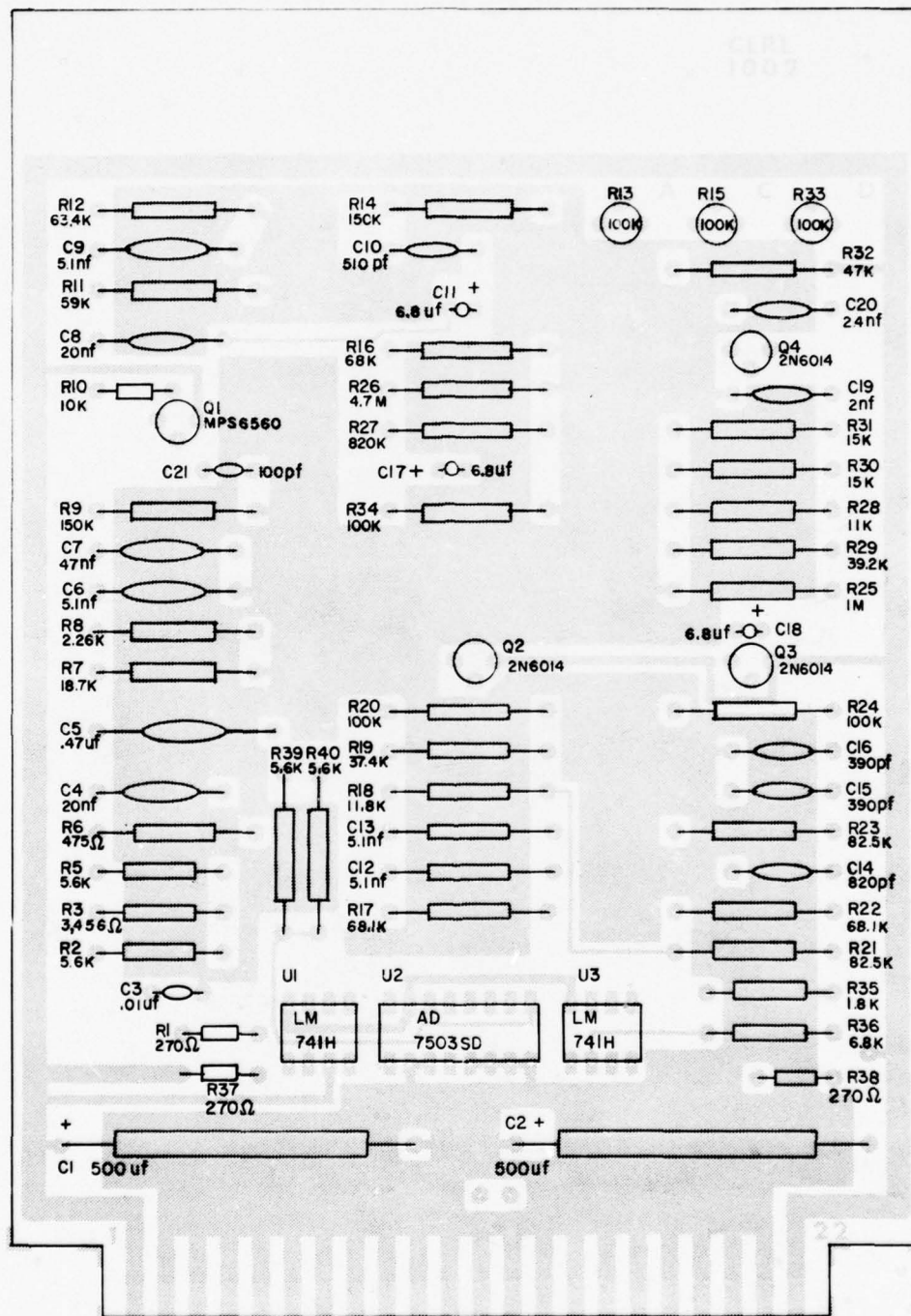
Table 4

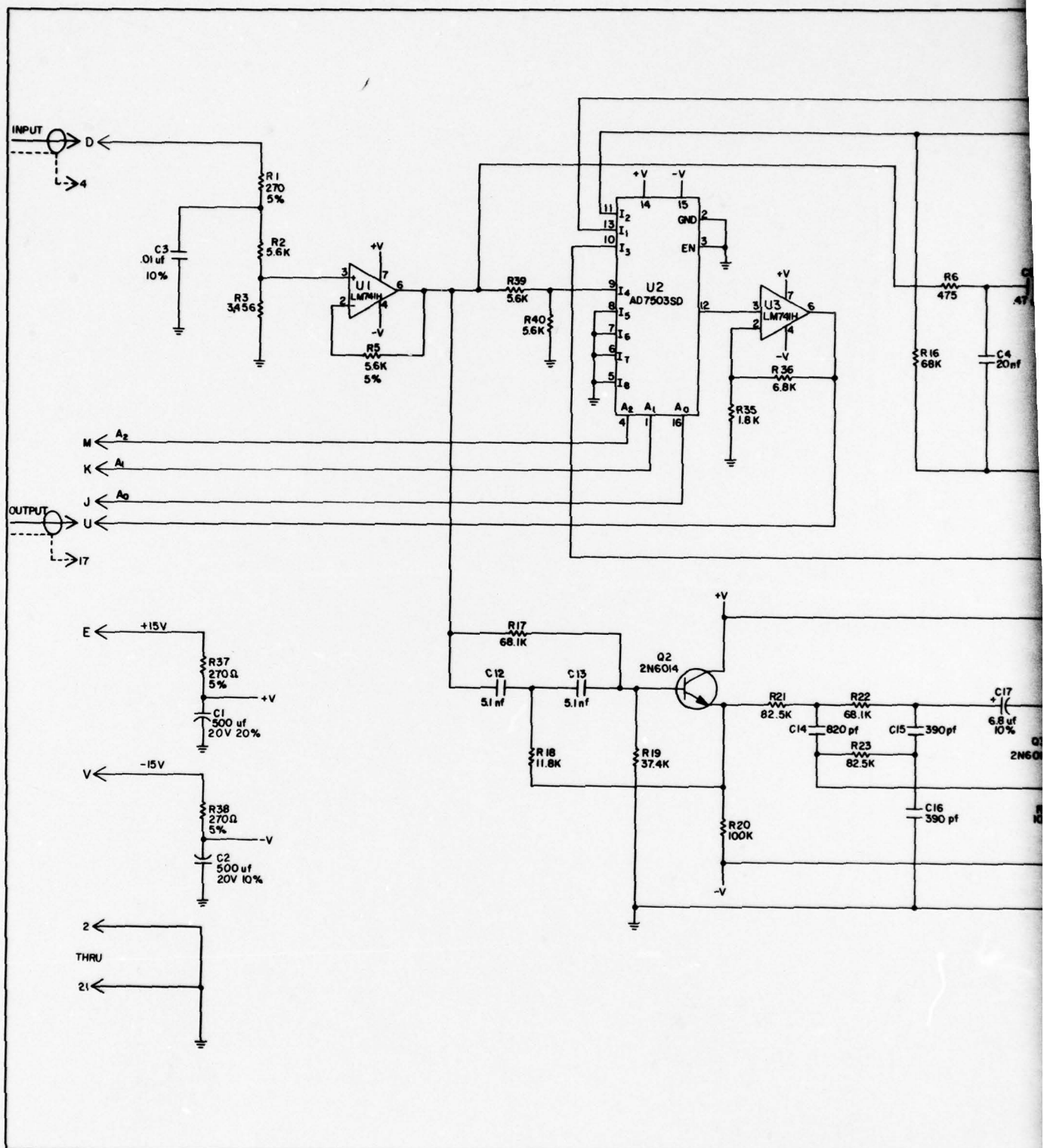
Board Number 1002 -- Parts List

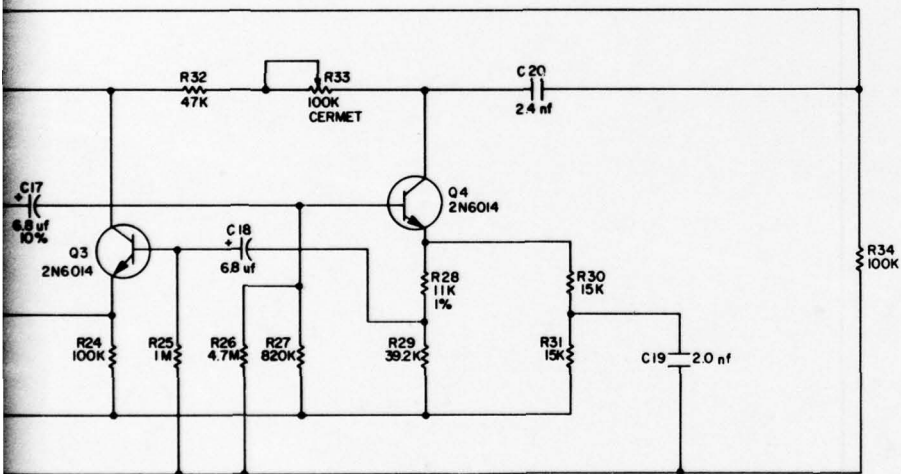
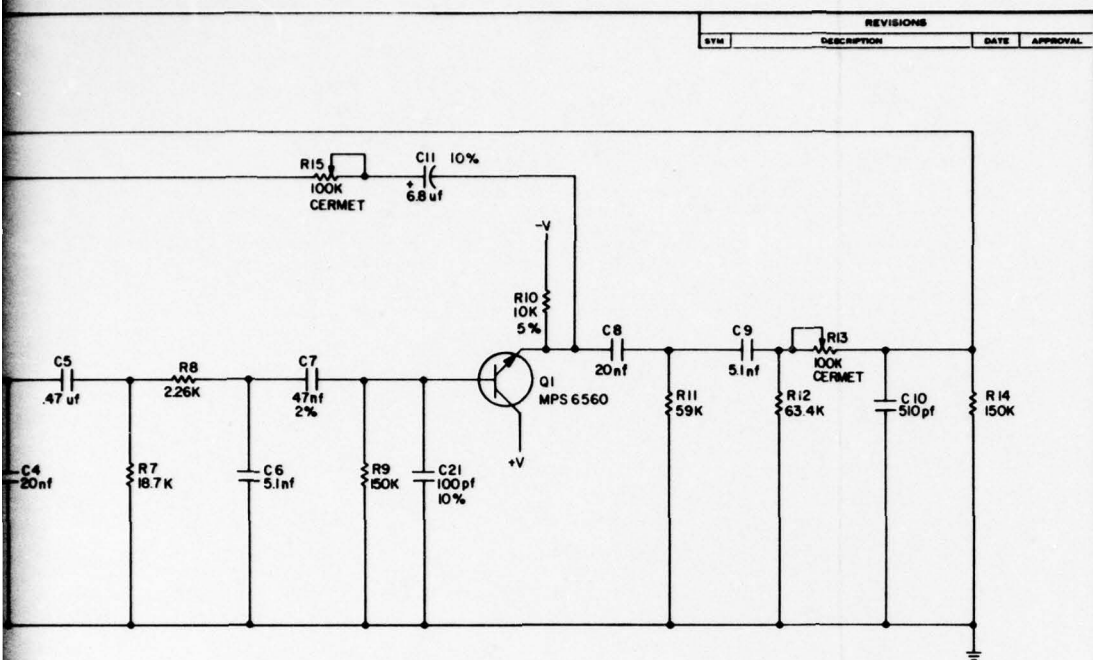
Circuit Diagram Reference	Component Type				
R1, R37, R38	Carbon	1/4W	5%	270	Ω
R6	Carbon film		1%	475	Ω
R35	Carbon film		1%	1.8 K	Ω
R8	Carbon film		1%	2.26K	Ω
R3	Carbon film		1%	3456	Ω
R5	Carbon		5%	5.6 K	Ω
R2, R39, R40	Carbon film		1%	5.6 K	Ω
R36	Carbon film		1%	6.8 K	Ω
R10	Carbon		5%	10	K Ω
R28	Carbon film		1%	11	K Ω
R18	Carbon film		1%	11.8 K	Ω
R30, R31	Carbon film		1%	15	K Ω
R7	Carbon film		1%	18.7 K	Ω
R19	Carbon film		1%	37.4 K	Ω
R29	Carbon film		1%	39.2 K	Ω
R32	Carbon film		1%	47	K Ω
R11	Carbon film		1%	59	K Ω
R12	Carbon film		1%	63.4 K	Ω
R16	Carbon film		1%	68	K Ω
R17, R22	Carbon film		1%	68.1 K	Ω
R21, R23	Carbon film		1%	82.5 K	Ω
R20, R24, R34	Carbon film		1%	100	K Ω
R9, R14	Carbon film		1%	150	K Ω
R27	Carbon film		1%	820	K Ω
R25	Carbon film		1%	1	M Ω
R26	Carbon film	1/2W	1%	4.7 M	Ω
R13, R15, R33	Trimmer	Cermet		100	K Ω
C21	Ceramic	100 pF		1	K V
C15, C16	Polystyrene	390 pF		63	V
C10	Polystyrene	510 pF		125	V
C14	Polystyrene	820 pF		63	V
C19	Polystyrene	2 nF		63	V
C20	Polystyrene	2.4 nF		63	V
C6, C9, C12, C13	Polystyrene	5.1 nF		63	V
C3	Ceramic	.01 nF		100	V

Table 4 (Cont'd)

Circuit Diagram Reference	Component Type			
C4, C8	Polystyrene	20 nF	63	V
C7	Polystyrene	.047 uF	160	V
C5	Polystyrene	.47 uF	63	V
C11, C17, C18	Tantalum	6.8 uF	6	V
C1, C2	Aluminum Elec- trolytic	500 uF	25	V
Q1	Si Trans	NPN	MPS 6560	
Q2, Q3, Q4	Si Trans	NPN	2N6014	
U1, U3	LM741H			
U2	AD7503SD			





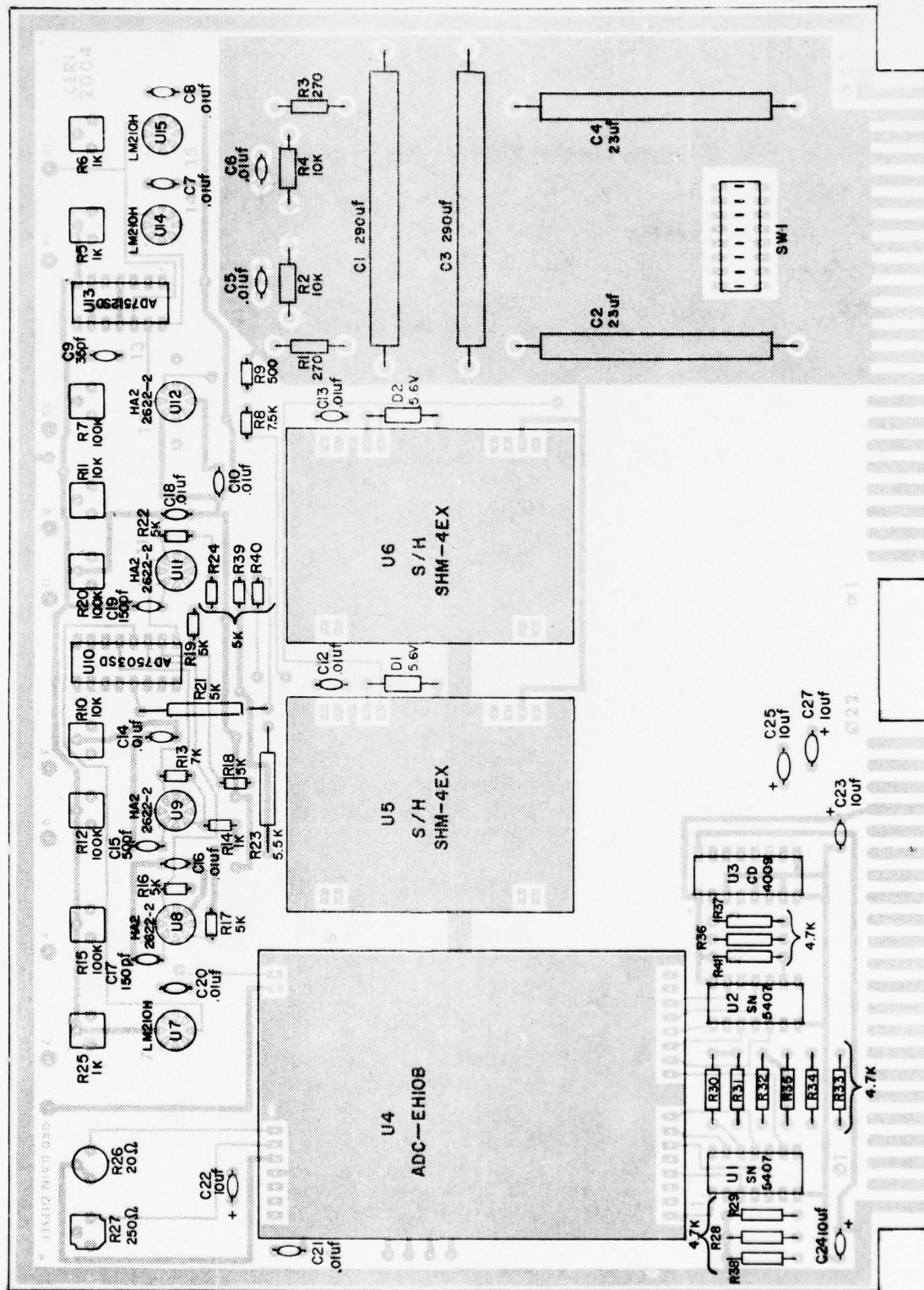


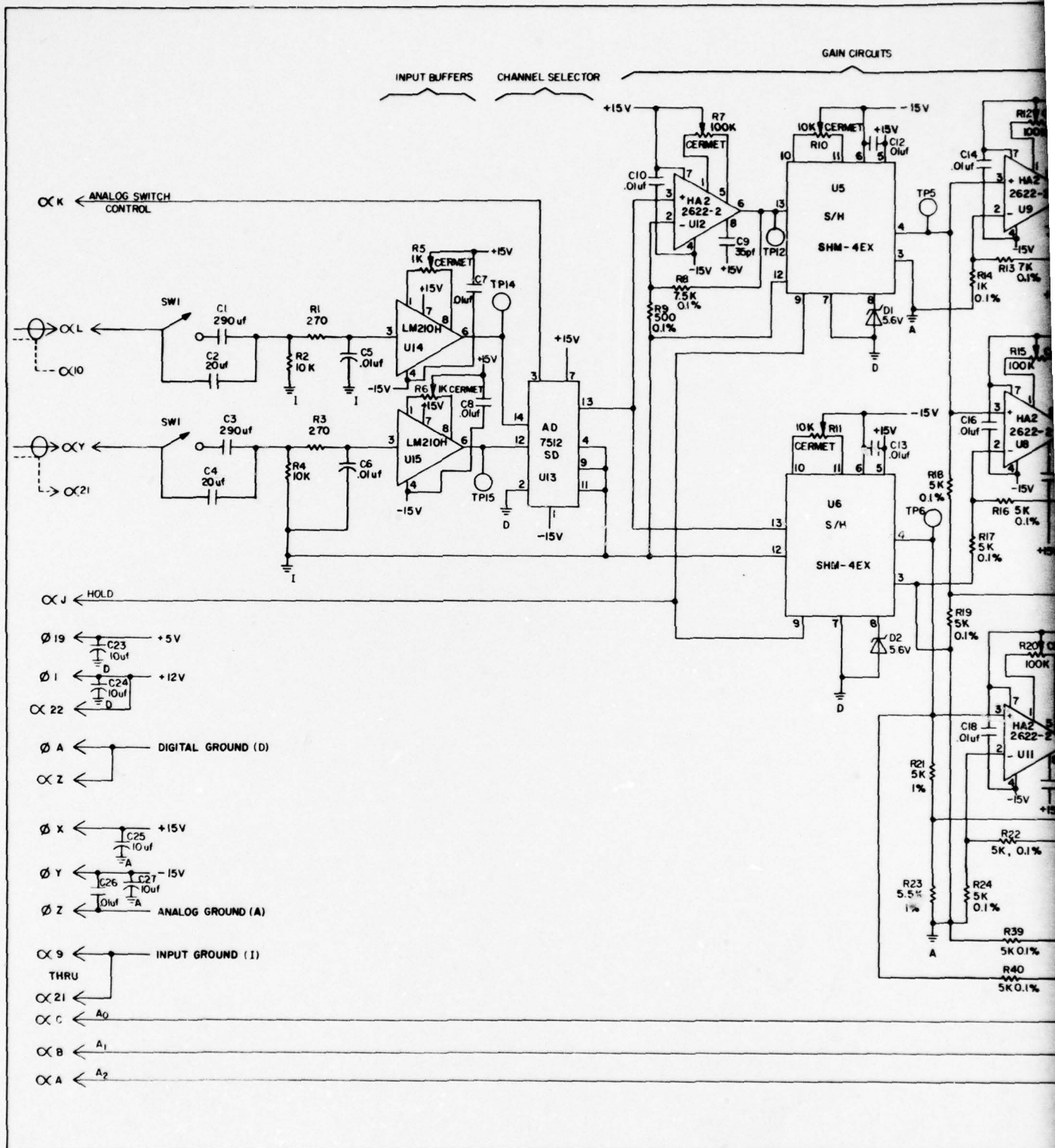
ALL RESISTORS 1% UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS 1% UNLESS OTHERWISE SPECIFIED

REQD	PART NO.	DESCRIPTION	MATL.	MATL SPEC	UNIT WT
LIST OF MATERIAL					
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>UNLESS OTHERWISE SPECIFIED</p> <p>SUPPLIERS ARE TO FURNISH DIMENSIONS ON FUNCTIONS</p> <p>DETAILS ANGLES</p> </div> <div style="width: 30%;"> <p>DRAWN <u>R.W.W. 4/8/77</u></p> <p>CHECKED <u>M.M.W. 3/13/78</u></p> <p>APPROVED <u>A.A.B. 8/15/78</u></p> <p>TRACED _____</p> <p>DATE _____</p> </div> <div style="width: 30%; text-align: center;"> <p>DIAGRAM, SCHEMATIC</p> <p>P.C. BOARD</p> </div> </div>					
<p>DEPARTMENT OF THE ARMY CORPS OF ENGINEERS CONSTRUCTION ENGINEERING RESEARCH LABORATORY CHAMPAIGN, ILL.</p>					<p>DWG. NO.</p> <p>1002</p>
SCALE					

Table 5
Board Number 2004 -- Parts List

Circuit Diagram Reference		Component Type				
R1, R3	Carbon	1/4W	5%	270	Ω	
R9	Bulk metal film	0.3W	0.1%	500	Ω	
R14	Bulk metal film	0.3W	0.1%	1	K Ω	
R28-R38, R41	Carbon	1/4W	5%	4.7	K Ω	
R21	Carbon film		1%	5	K Ω	
R16-R19, R22, R24, R39, R40	Bulk metal	0.3W	0.1%	5	K Ω	
R23	Carbon film	1/4W	1%	5.5	K Ω	
R13	Bulk metal	0.3W	0.1%	7	K Ω	
R8				7.5	K Ω	
R2, R4	Carbon	1/4W	5%	10	K Ω	
R26	Trimmer	Cermet		20	Ω	
R27	Trimmer	Cermet		250	Ω	
R5, R6, R25	Trimmer	Cermet		1	K Ω	
R10, R11	Trimmer	Cermet		10	K Ω	
R7, R12, R15, R20	Trimmer	Cermet		100	K Ω	
C9	Ceramic	35 pF		1	K V	
C15	Ceramic	50 pF				
C17, C19	Ceramic	150 pF				
C5-C8, C10, C12-C14, C16, C18	Ceramic	.01 uF		100	V	
C20, C21, C26						
C22-C25, C27	Tantalum	10 uF		35	V	
C2, C4	Tantalum	20 uF	NP	25	V	
C1, C3	Tantalum	290 uF	NP	25	V	
D1, D2	Zener	1W		5.6	V	
U1, U2	SN5407					
U3	CD4009					
U4	ADC-EH10B1-EX	A/D Converter				
U5, U6	SHM-4-EX	Sample and hold				
U7, U14, U15	LM210H					
U8, U9, U11, U12	HA2 2622-2					
U10	AD7503SD					
U13	AD7512SD					
SW1	Dip switch	8 station	SPST			





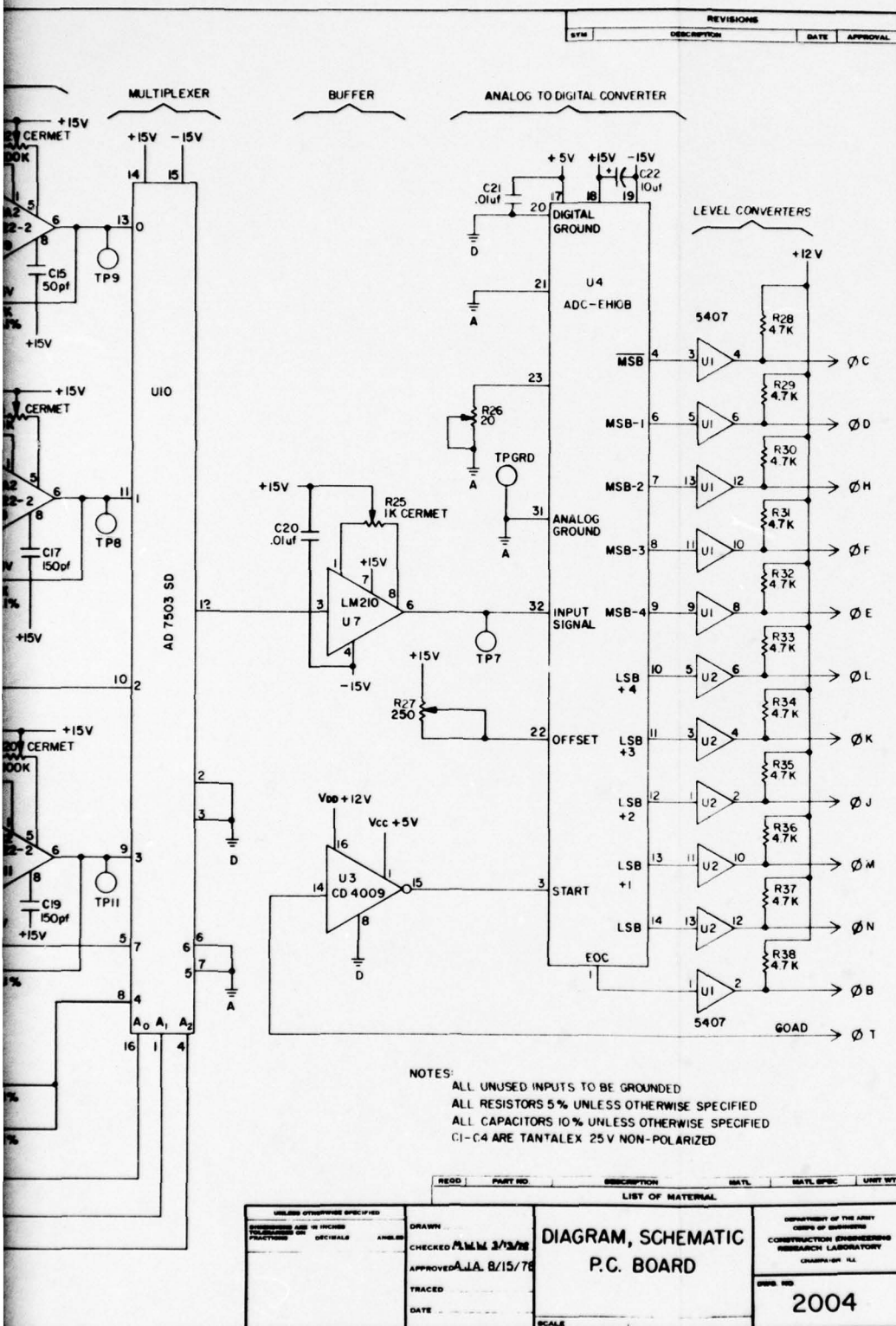
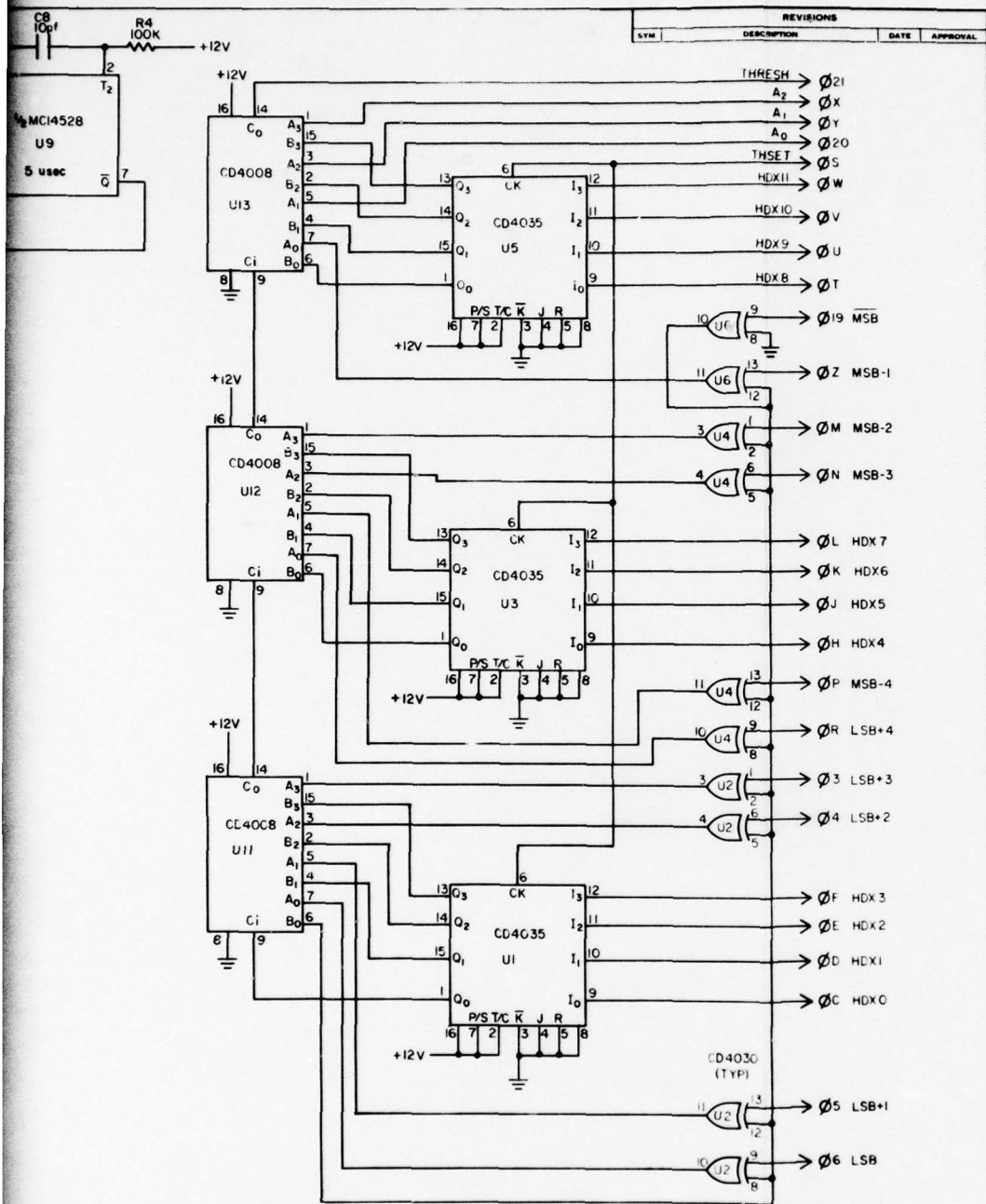
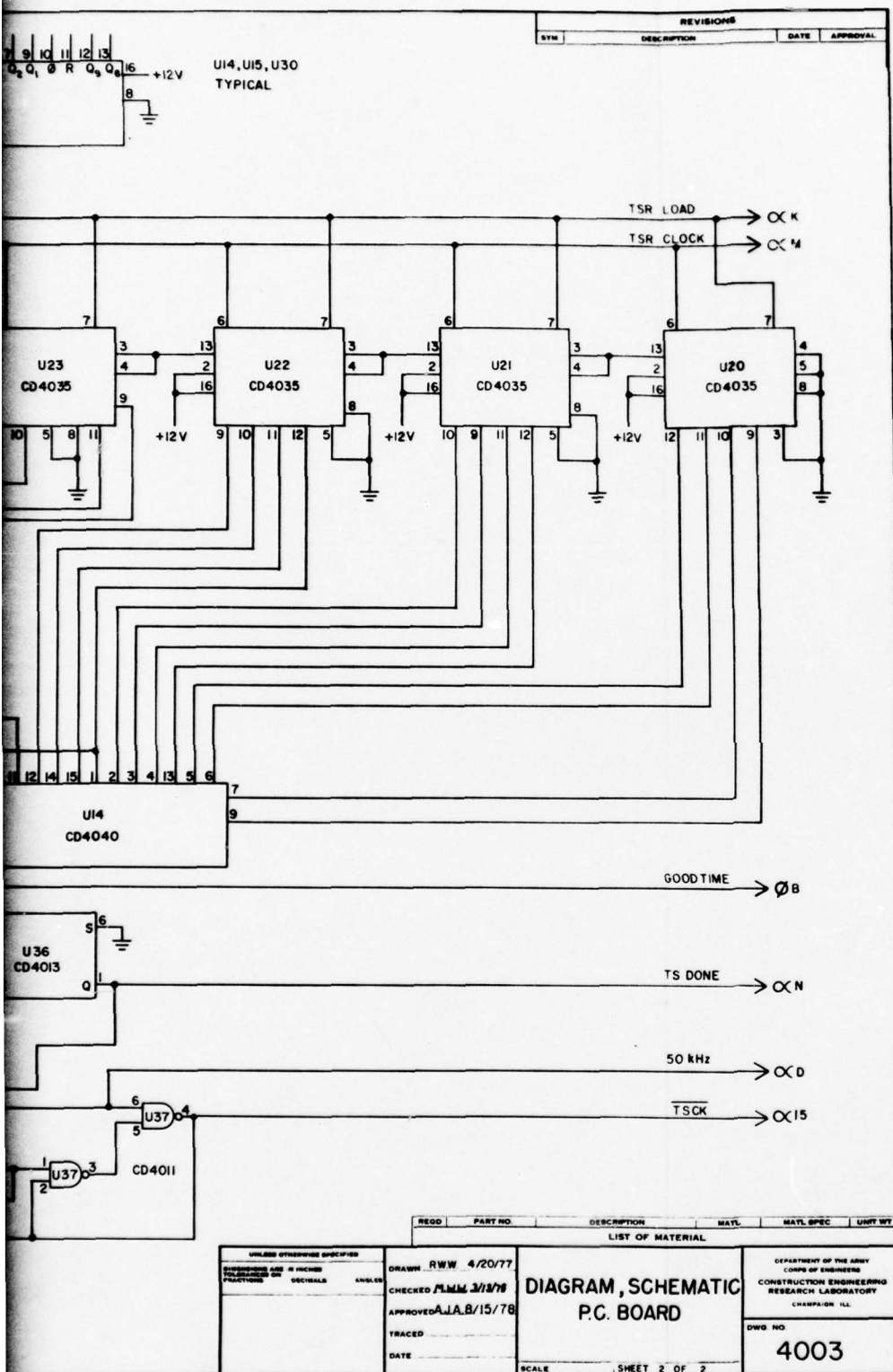


Table 6
Board Number 4003 -- Parts List

Circuit Diagram Reference	Component Type				
R6, R7	Carbon	1/4W	5%	4.7	K Ω
R1, R2, R3, R5, R8	Carbon	1/4W	5%	18	K Ω
R4	Carbon	1/4W	5%	100	K Ω
C5-C9, C11	Mica	10	pF	500	V
C10	Trimmer	4-47	pF		
C1-C4	Tantalum	10	uF	35	V
U1, U3, U5, U20-U25, U31-U33	CD4035				
U2, U4, U6	CD4030				
U7, U34	CD4009				
U8, U16, U19, U35, U37	CD4011				
U9, U26, U29	MC14528				
U10, U18, U27, U36	CD4013				
U11, U12, U13	CD4008				
U14, U15, U30	CD4040				
U17	CD4023				
U28	CD4029				



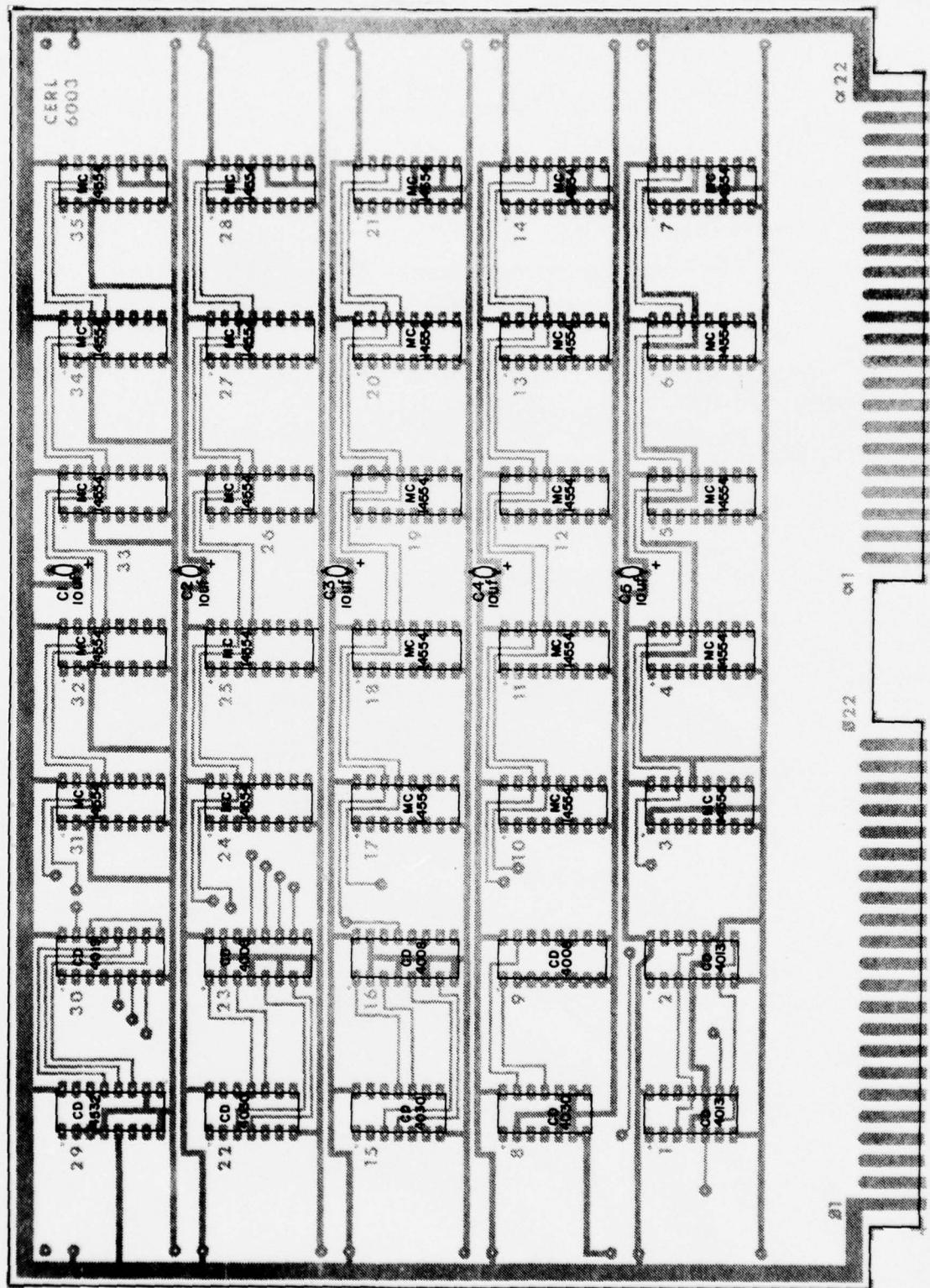
RECD	PART NO	DESCRIPTION	MATL	MATL SPEC	UNIT WT
LIST OF MATERIAL					
UNLESS OTHERWISE SPECIFIED					
DIMENSIONS ARE IN INCHES					
TOLERANCES ARE IN FRACTIONS					
DECIMALS ANGLES					
DRAWN R W 4/20/77					
CHECKED P. M. 3/1/78					
APPROVED J. A. 8/15/78					
TRACED					
DATE					
SCALE					
SHEET 1 OF 2					
DIAGRAM, SCHEMATIC				DEPARTMENT OF THE ARMY	
P.C. BOARD				CONSTRUCTION ENGINEERING	
				RESEARCH LABORATORY	
				CHAMPAIGN, ILL.	
				DOW NO	
				4003	

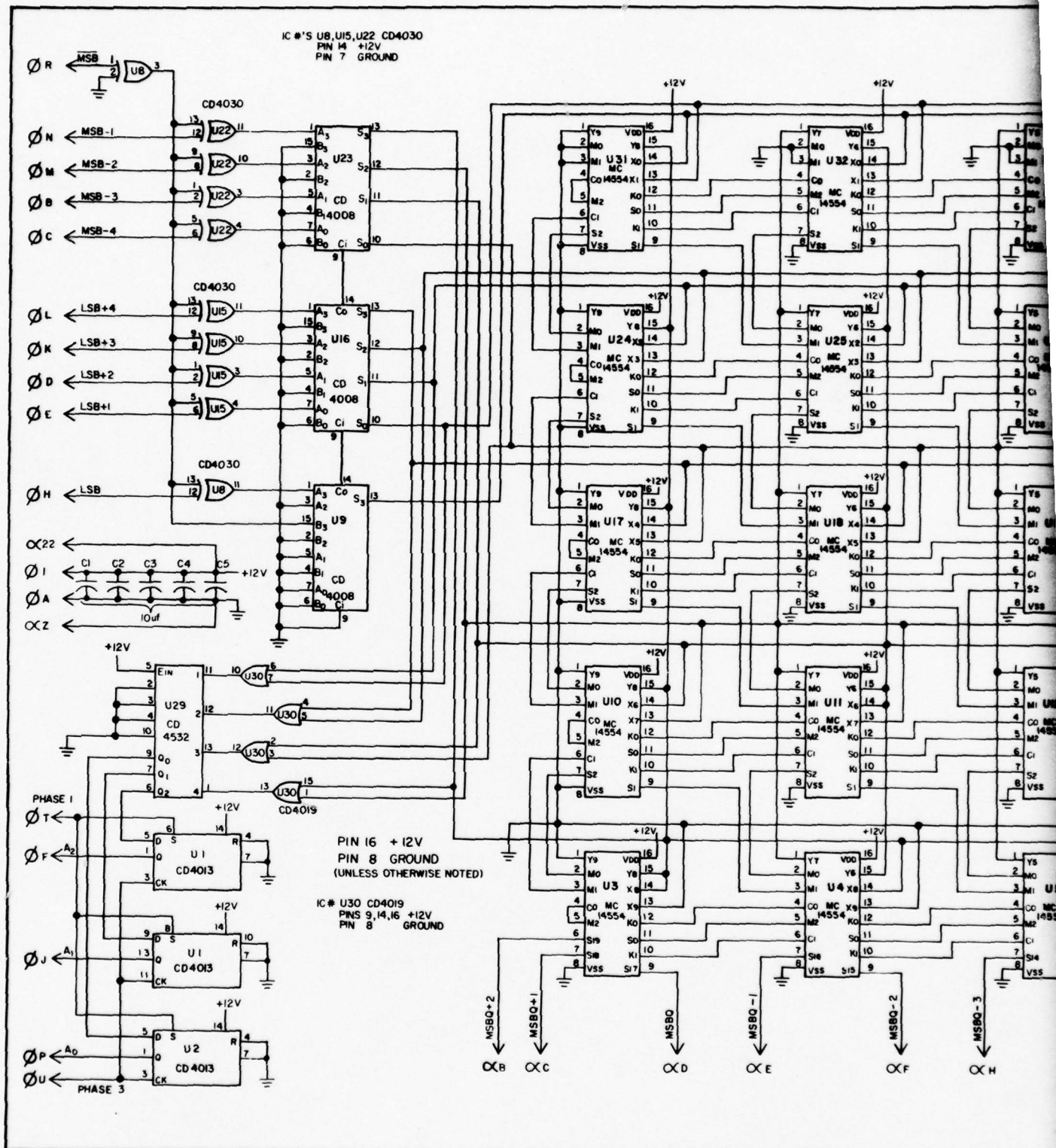


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Table 7
Board Number 6003 -- Parts List

Circuit Diagram Reference	Component Type			
C1-C5	Tantalum	10 uF	35	V
U1, U2	CD 4013			
U3-U7, U10-U14, U17-U21	MC14554			
U24-U28, U31-U35	MC14554			
U8, U15, U22	CD4030			
U9, U16, U23	CD4008			
U29	CD4532			
U30	CD4019			





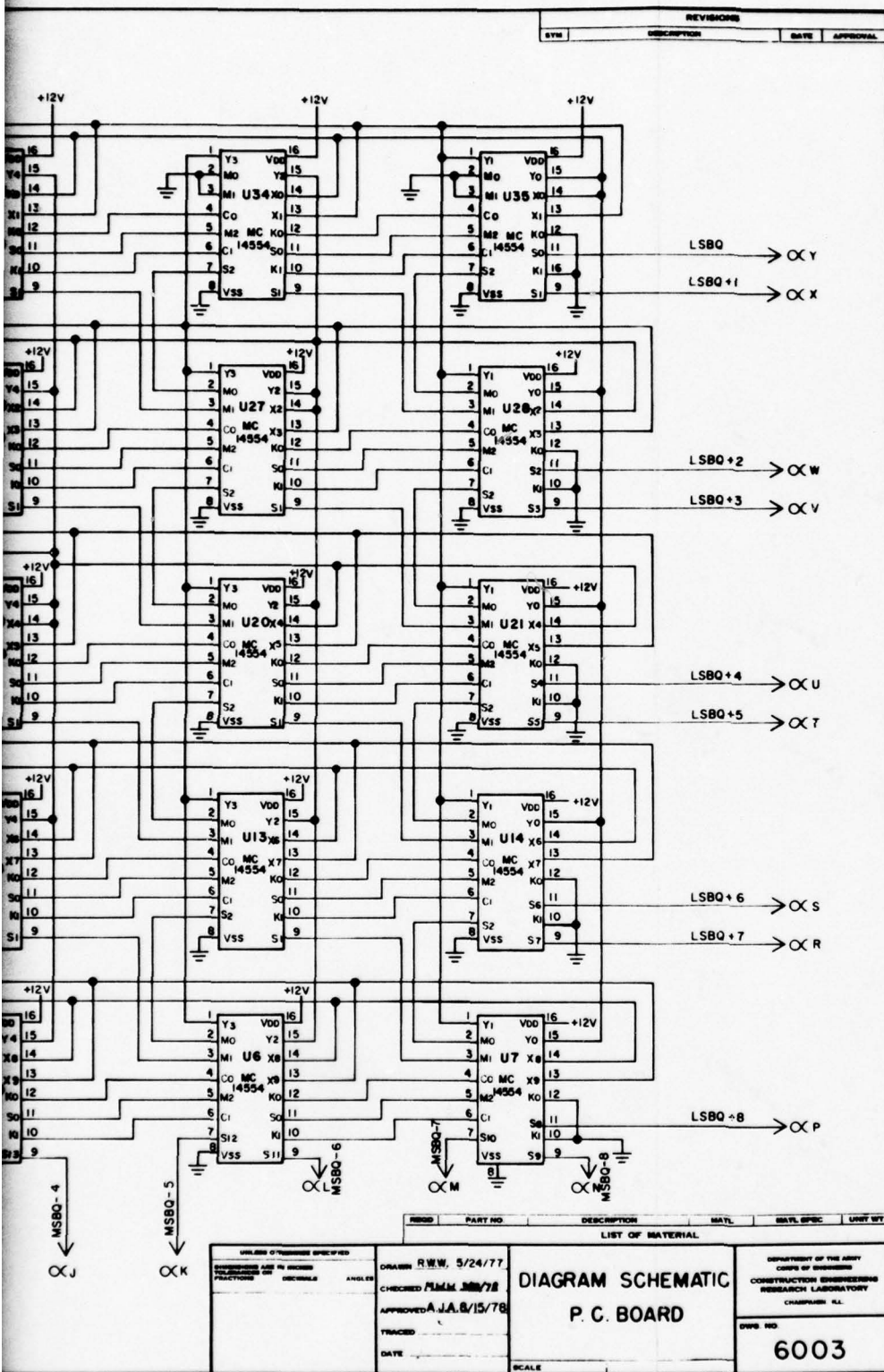
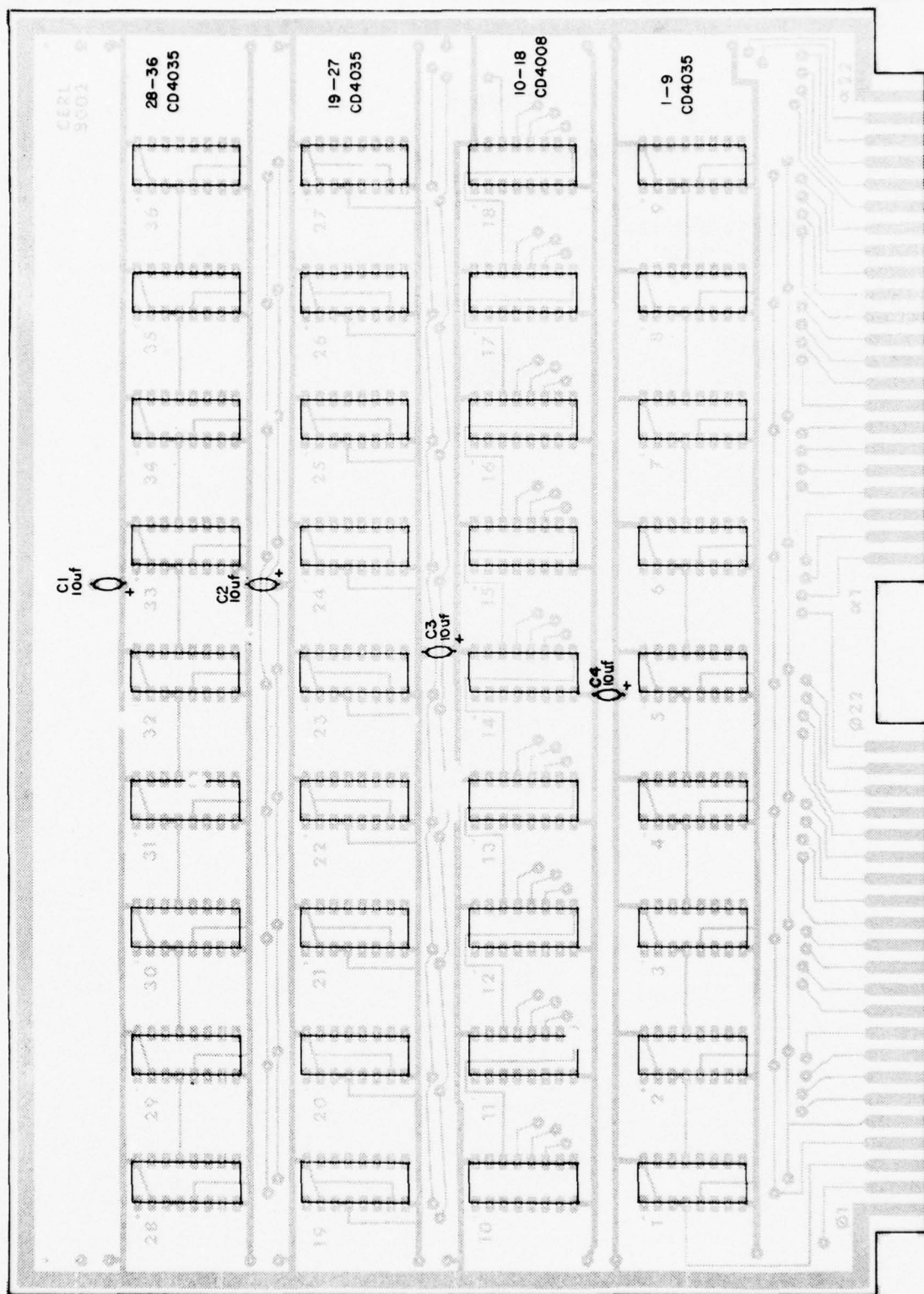


Table 8

Board Number 8002 -- Parts List

Circuit Diagram Reference	Component Type			
C1-C4	Tantalum	10 μ F	35	V
U1-U9, U19-U36	CD4035			
U10-U18	CD4008			



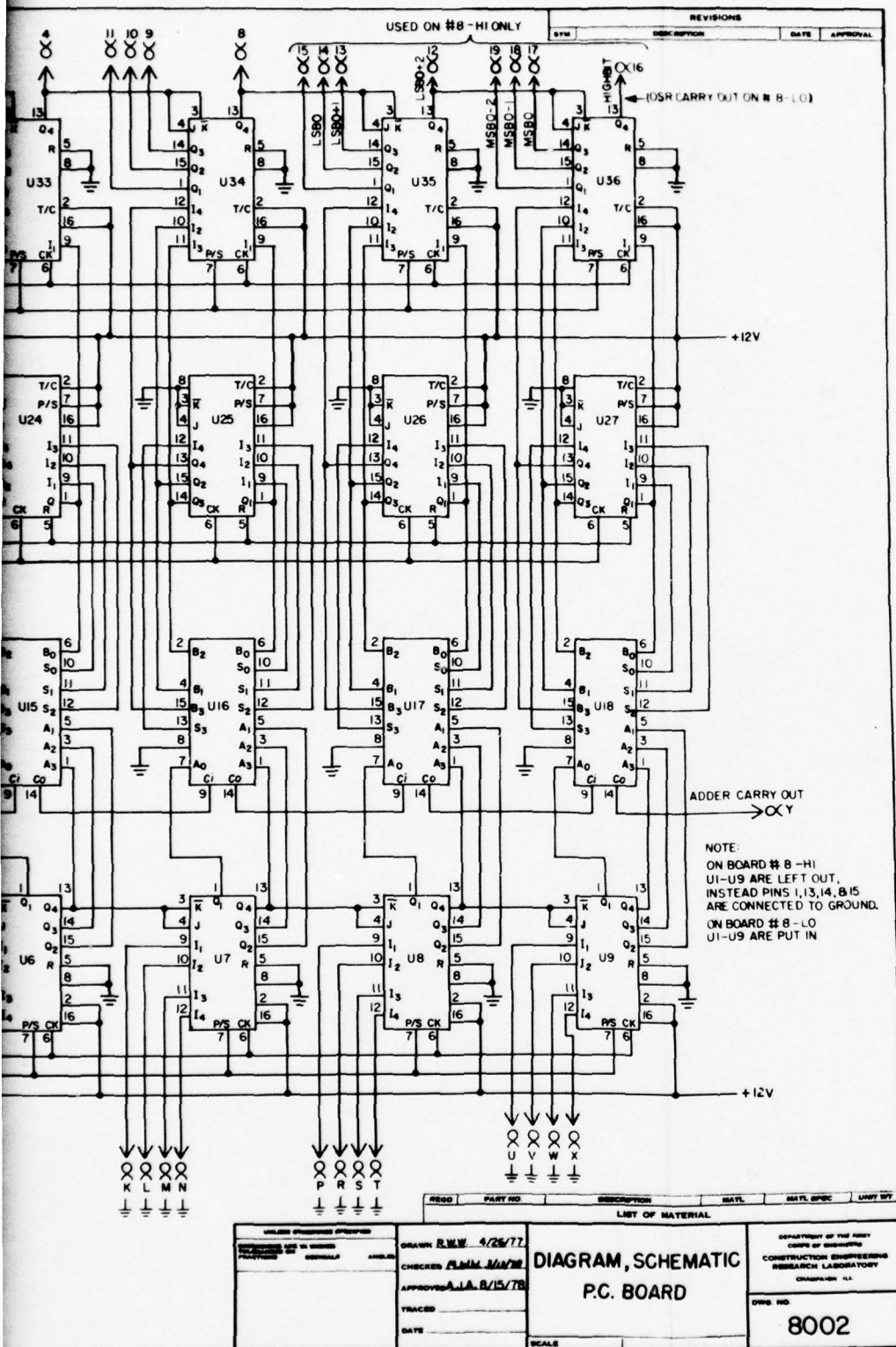
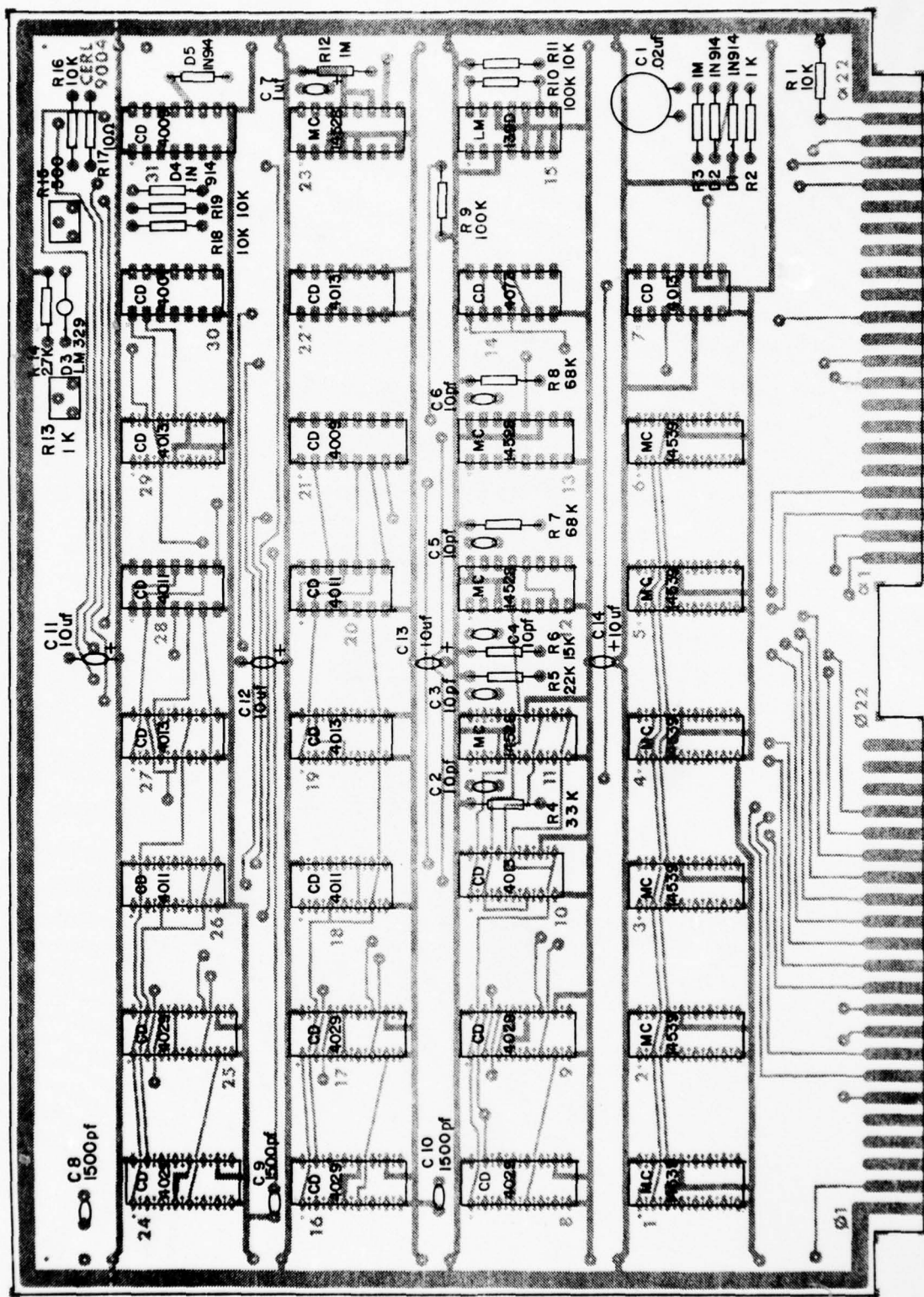


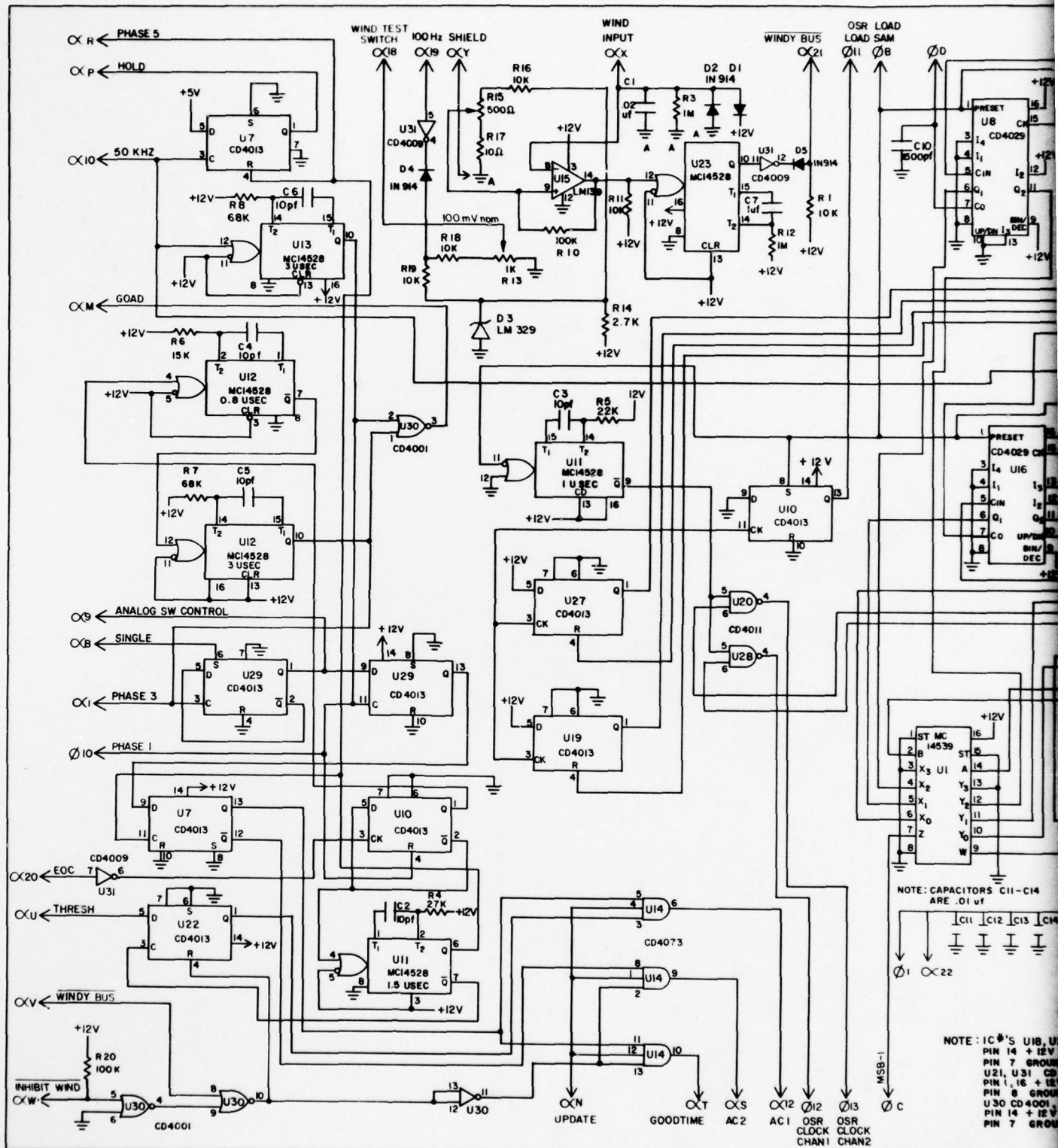
Table 9

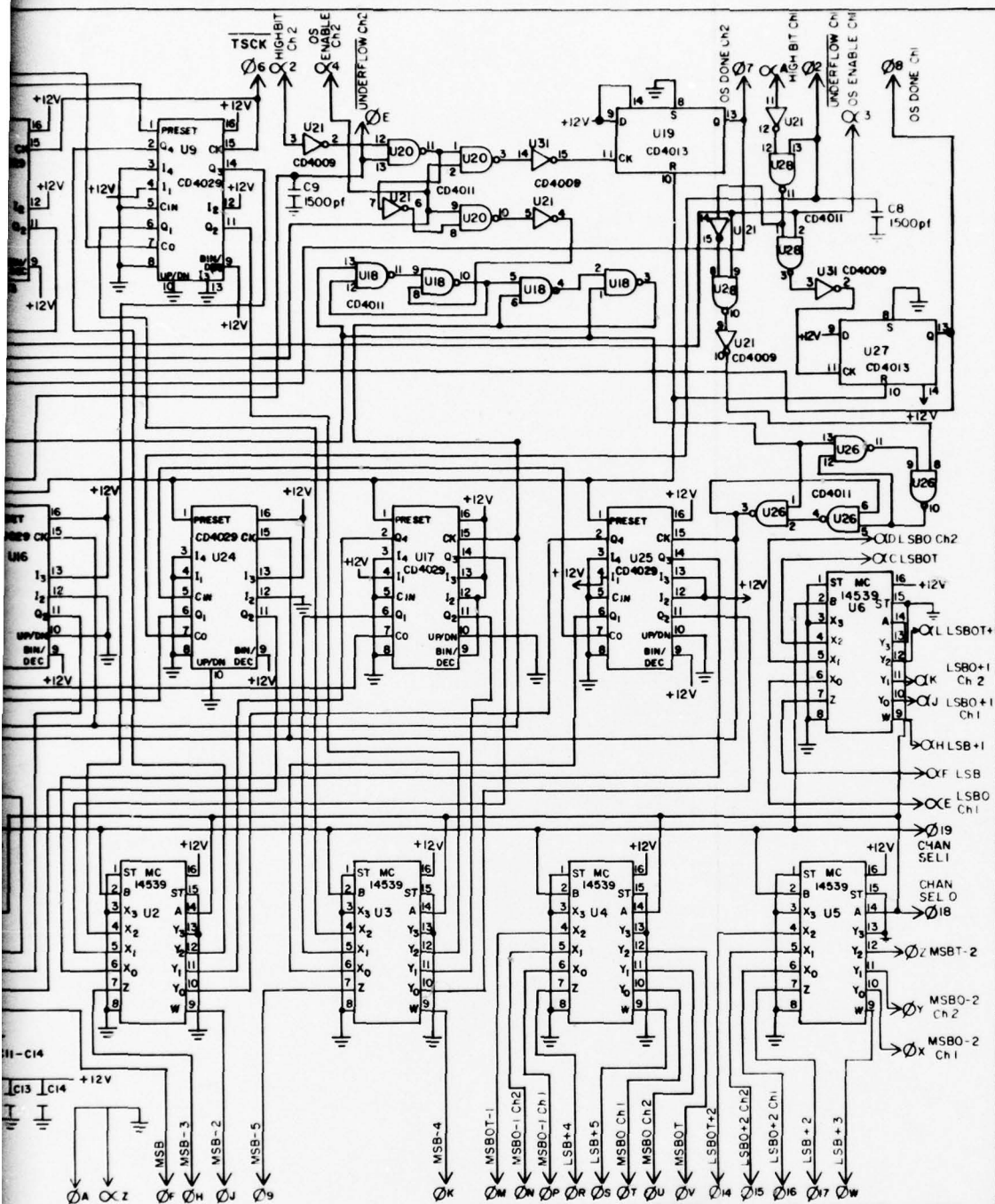
Board Number 9004 -- Parts List

Circuit Diagram Reference	Component Type				
R17	Carbon	1/4W	5%	10	Ω
R2	Carbon	1/4W	5%	1	K Ω
R14	Carbon	1/4W	5%	2.7	K Ω
R1, R11, R16, R18, R19	Carbon	1/4W	5%		
R6	Carbon	1/4W	5%	15	K Ω
R5	Carbon	1/4W	5%	22	K Ω
R4	Carbon	1/4W	5%	33	K Ω
R7, R8	Carbon	1/4W	5%	68	K Ω
R9, R10, R20	Carbon	1/4W	5%	100	K Ω
R3, R12	Carbon	1/4W	5%	1	M Ω
R15	Trimmer	Cermet		500	Ω
R13	Trimmer	Cermet		1	K Ω
C2-C6	Ceramic	10 pF		500	V
C8-C10	Ceramic	1500 pF		1	K V
C1	Ceramic	.02 uF		1	K V
C7	Tantalum	1 uF		35	V
C11-C14	Tantalum	10 uF		35	V
D1, D2, D4, D5	IN914B	Silicon Diode			
D3	LM329H	Zener 6.95V			
U1-U6	MC14539				
U7, U10, U19, U22, U27, U29	CD4013				
U8, U9, U16, U17, U24, U25	CD4029				
U11-U13, U23	MC14528				
U14	CD4073				
U15	LM139D				
U18, U20, U26, U28	CD4011				
U21, U31	CD4009				
U30	CD4001				



NOTE: C11-C14 ARE BYPASS CAPACITORS. R20 IS LOCATED ON REVERSE SIDE OF BOARD, 100 KΩ R9 IS USED TO TIE UNUSED INPUT OF U13 HIGH.



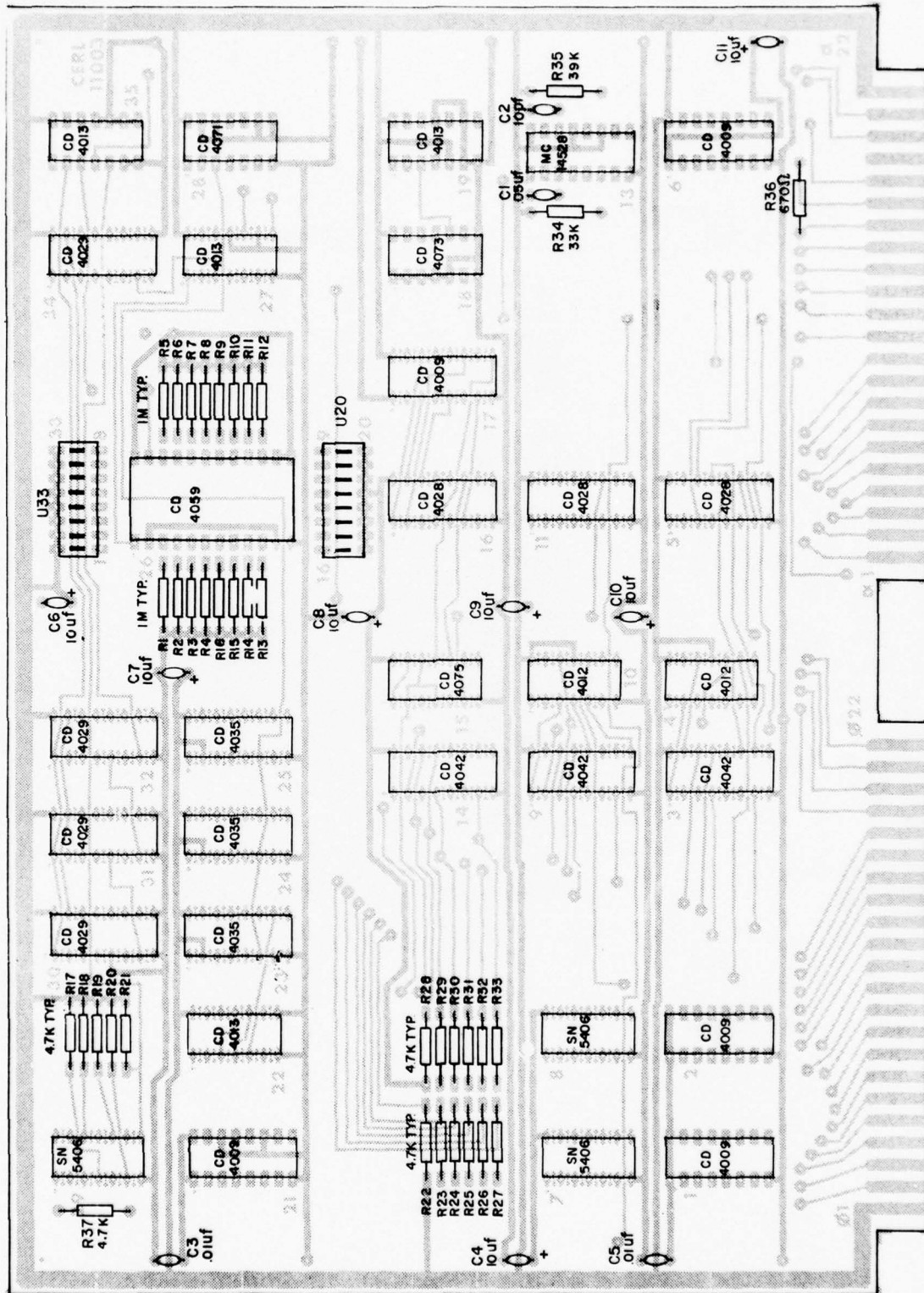


5 U18, U20, U26, U28 CD 4011
 14 + 12V
 7 GROUND
 U31 CD 4009
 1, 16 + 12V
 9 GROUND
 CD 4001, U14 CD 4073
 14 + 12V
 7 GROUND

REQD	PART NO	DESCRIPTION	MATL	MATL SPEC	UNIT WT
LIST OF MATERIAL					
USED OVERVIEW SPECIFIED DRAWN: R.W. 7/12/77 CHECKED: R.M. 3/1/78 APPROVED: A.L.A. 8/13/78 TRACED: _____ DATE: _____ SCALE: _____					
DIAGRAM, SCHEMATIC P.C. BOARD					
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS CONSTRUCTION ENGINEERING RESEARCH LABORATORY CHANSHAW, ILL.					
DWS NO 9004					

Table 10
Board Number 11003 -- Parts List

Circuit Diagram Reference	Component Type				
R36	Carbon	1/4W	5%	670	Ω
R17-R33, R37	Carbon	1/4W	5%	4.7 K	Ω
R34	Carbon	1/4W	5%	33	K Ω
R35	Carbon	1/4W	5%	39	K Ω
R1-R16	Carbon	1/4W	5%	1	M Ω
C2	Mica	10 pF		500	V
C3, C5	Ceramic	.01 uF		100	V
C1	Ceramic	.05 uF		50	V
C4, C6-C11	Tantalum	10 uF		35	V
U1, U2, U6, U17, U21	CD4009				
U3, U9, U14	CD4042				
U4, U10	CD4012				
U5, U11, U16	CD4028				
U7, U8, U29	SN5406				
U13	MC14528				
U15	CD4075				
U18	CD4073				
U19, U22, U27, U35	CD4013				
U23-U25	CD4035				
U26	CD4059				
U28	CD4071				
U30-U32, U34	CD4029				
U20, U33	Dipswitch	8 Station	SPST		



NOTE: C3-C11 ARE BYPASS CAPACITORS. R37 IS USED TO THE UNUSED INPUT OF U29 HIGH.

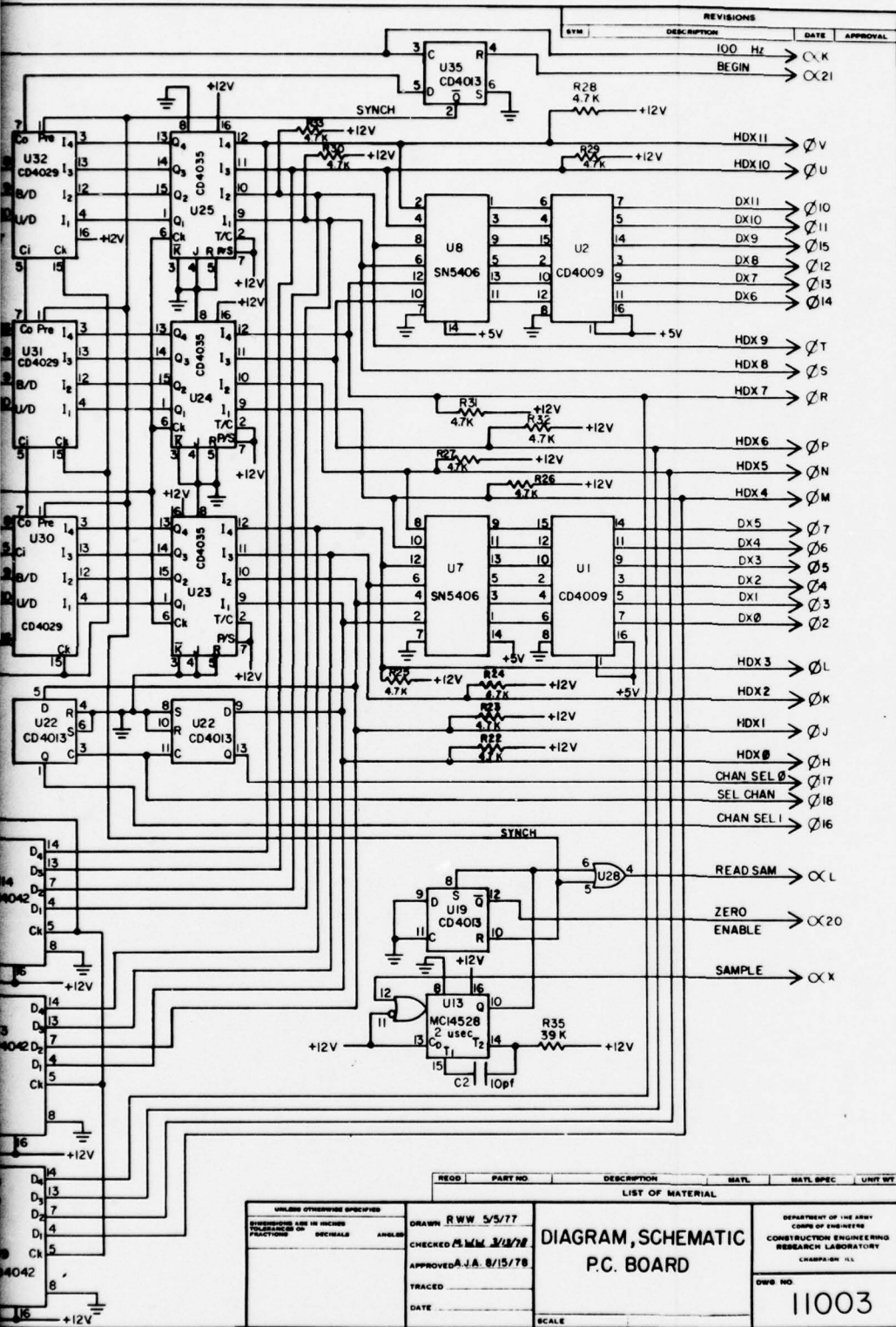
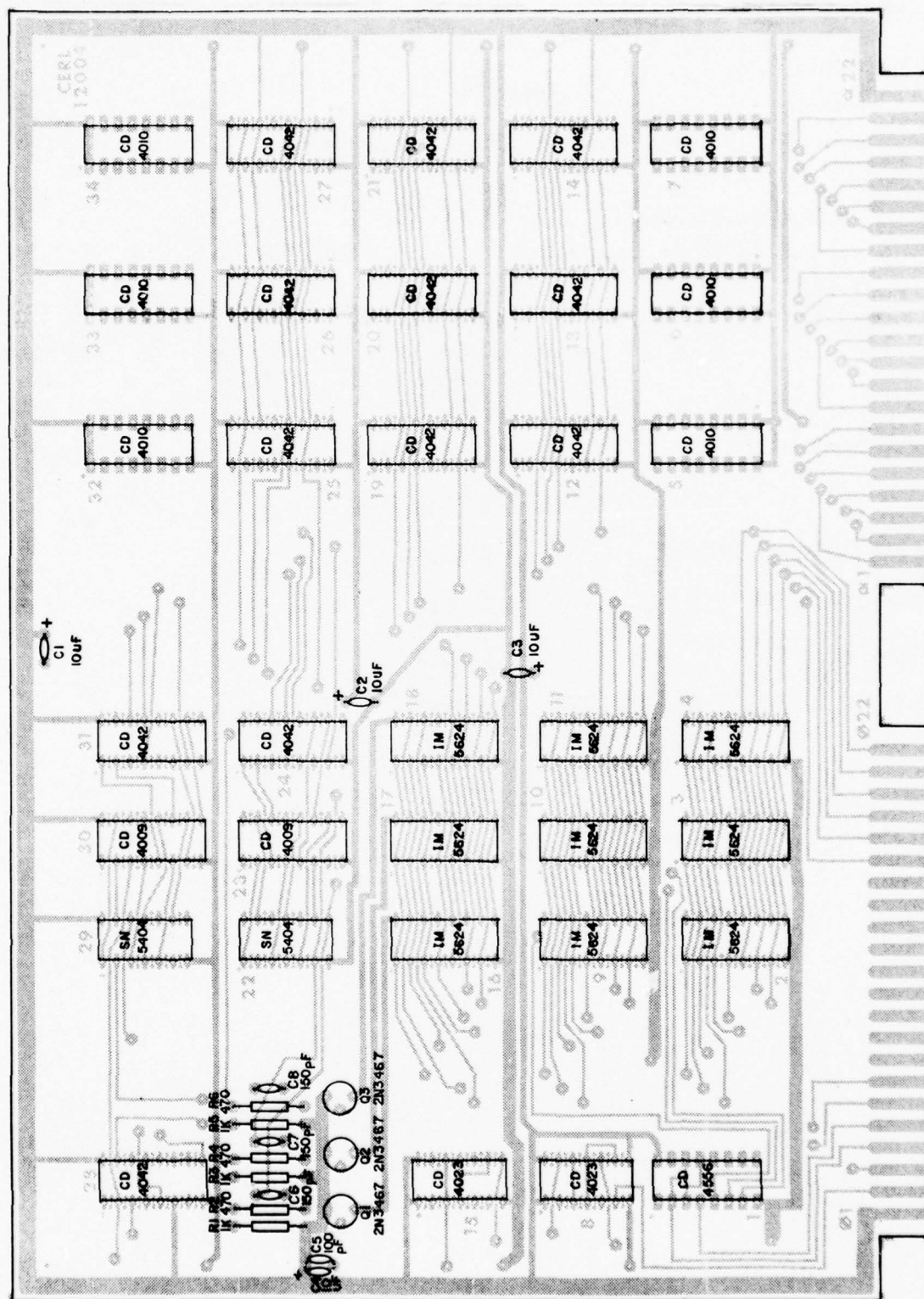


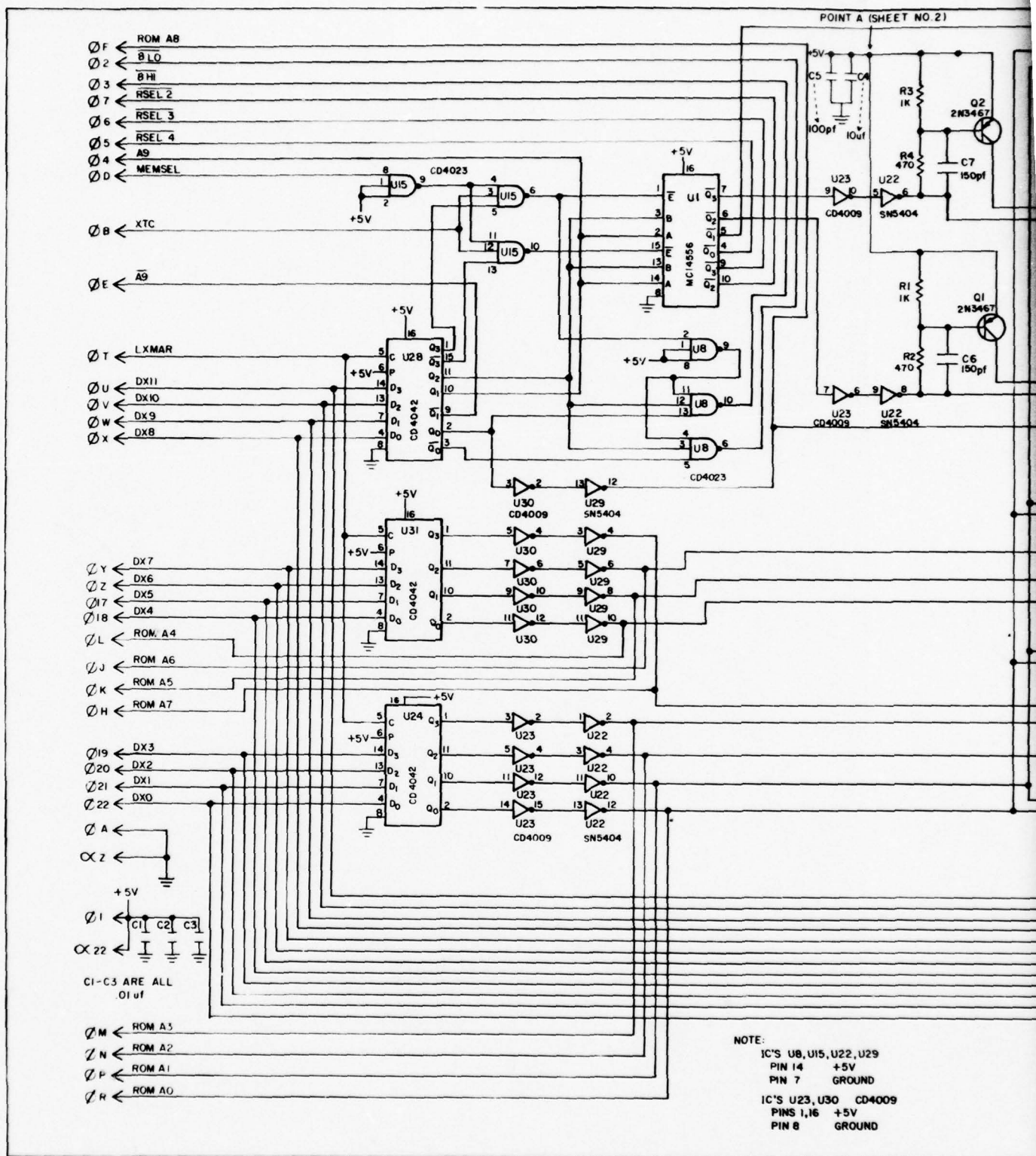
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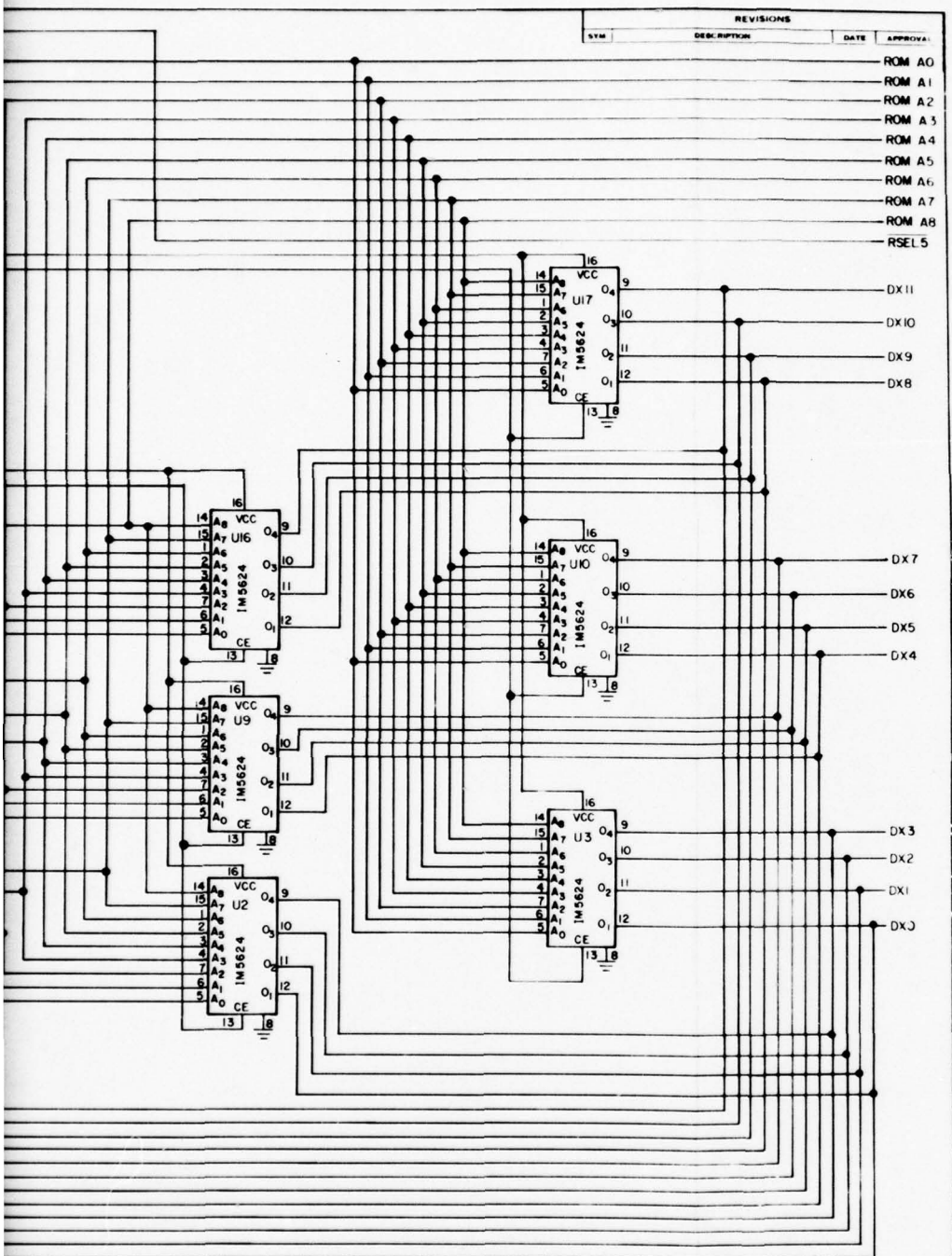
Board Number 12004 -- Parts List

Circuit Diagram Reference	Component Type			
R2, R4, R6	CARBON	1/4W	5%	470 Ω
R1, R3, R5	CARBON	1/4W	5%	1 K Ω
C1-C4	TANTALUM	10 μ F		35 V
C5	CERAMIC	100 pF		1 KV
C6-C8	CERAMIC	150 pF		1 KV
Q1-Q3	SILICON TRANS.	PNP		2N3467
U1	CD 4556			
U2-U4, U9-U11, U16-U13	IM 5624			
U5-U7, U32-U34	CD 4010			
U8, U15	CD 4023			
U12-U14, U19-U21, U24-U28, U31	CD 4042			
U22, U29	SN 5404			
U23, U30	CD 4009			



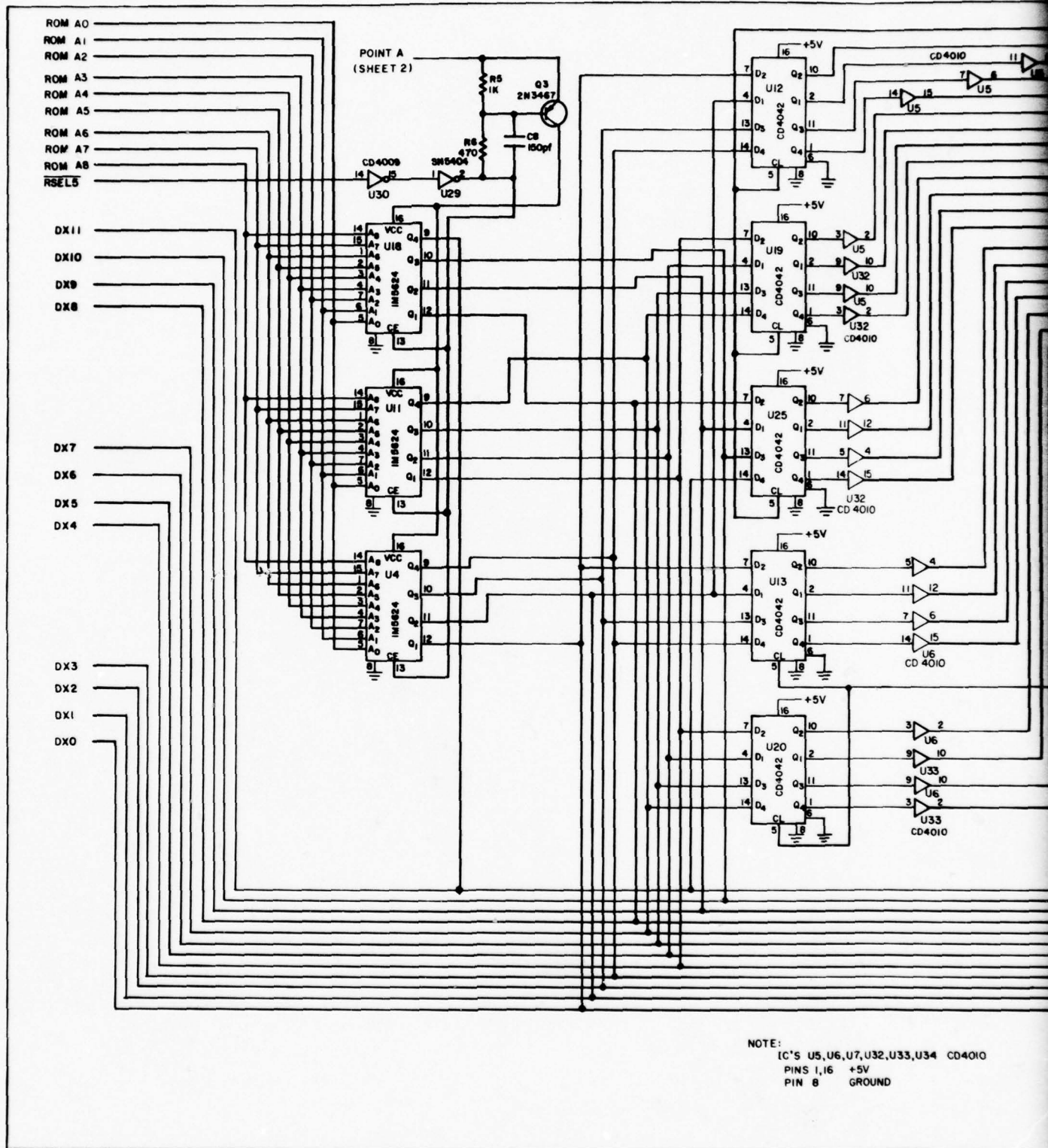
NOTE: C1-C5 ARE BYPASS CAPACITORS.

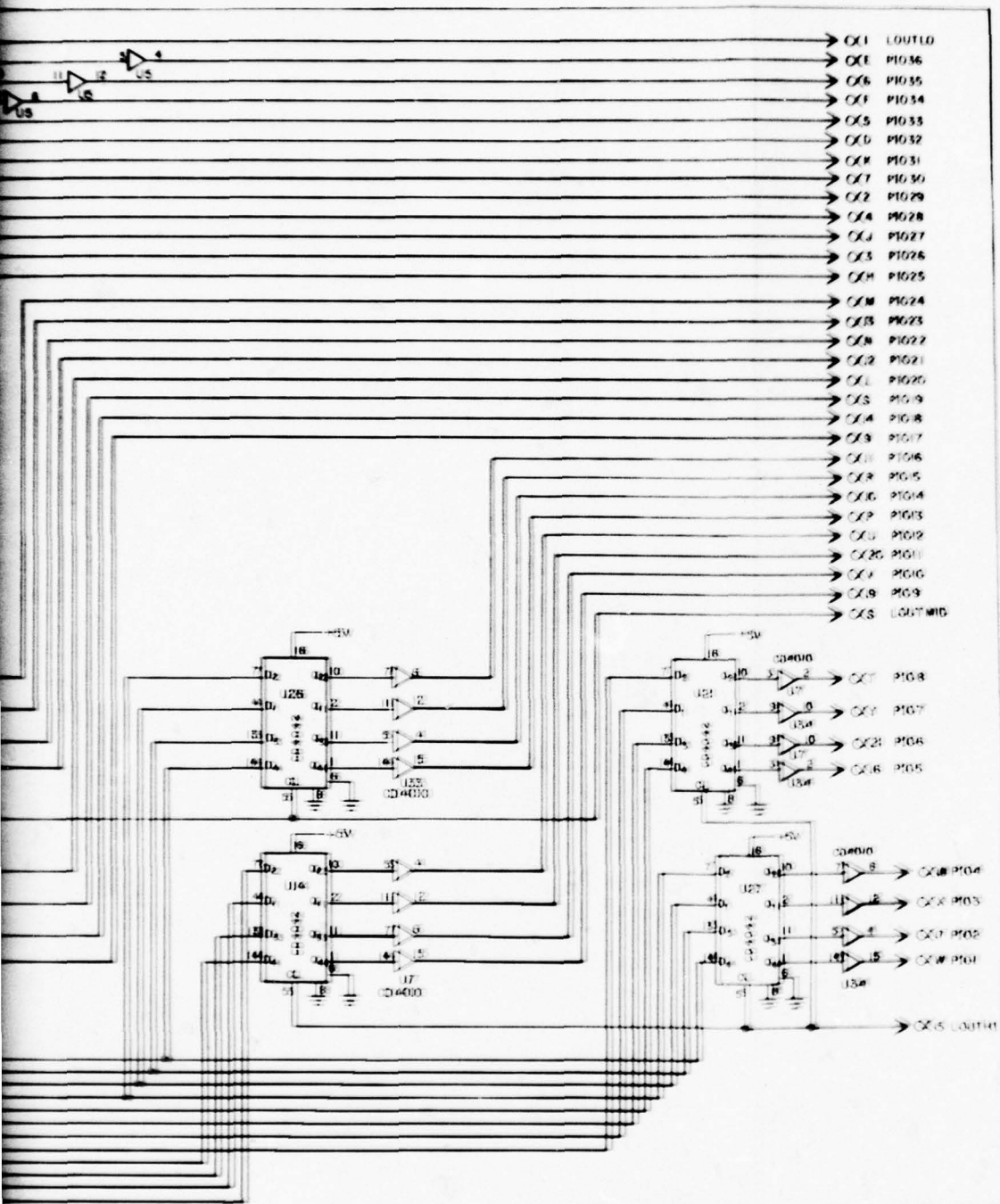




REVISED		PART NO	DESCRIPTION	MATL	MATL SPEC	UNIT WT
LIST OF MATERIAL						
UNLESS OTHERWISE SPECIFIED		DRAWN RWW 7/6/77		DEPARTMENT OF THE ARMY		
DIMENSIONS ARE IN INCHES		CHECKED P.M.M. 3/4/78		HEADQUARTERS ENGINEERING		
TOLERANCES ON		APPROVED J.A.B. 15/78		CONSTRUCTION ENGINEERING		
FRACTIONS		TRACED		RESEARCH LABORATORY		
DECIMALS		DATE		DWG NO		
ANGLES		SCALE		12004		
		SHEET 1 OF 2				

2





- C01 LOUT10
- C01 P1036
- C06 P1035
- C01 P1034
- C03 P1033
- C00 P1032
- C08 P1031
- C07 P1030
- C02 P1029
- C04 P1028
- C04 P1027
- C03 P1026
- C08 P1025
- C08 P1024
- C08 P1023
- C08 P1022
- C02 P1021
- C01 P1020
- C03 P1019
- C04 P1018
- C03 P1017
- C01 P1016
- C08 P1015
- C06 P1014
- C09 P1013
- C00 P1012
- C020 P1011
- C04 P1010
- C09 P1009
- C05 LOUT110

- C01 P108
- C07 P107
- C021 P106
- C06 P105
- C08 P104
- C08 P103
- C07 P102
- C08 P101
- C05 LOUT111

DESIGNED BY: P.W.M. / 1/8/77 CHECKED BY: T.M.M. / 1/8/77 APPROVED BY: A.A.G. / 1/8/77 DATE:		DIAGRAM, SCHEMATIC PC BOARD	12004
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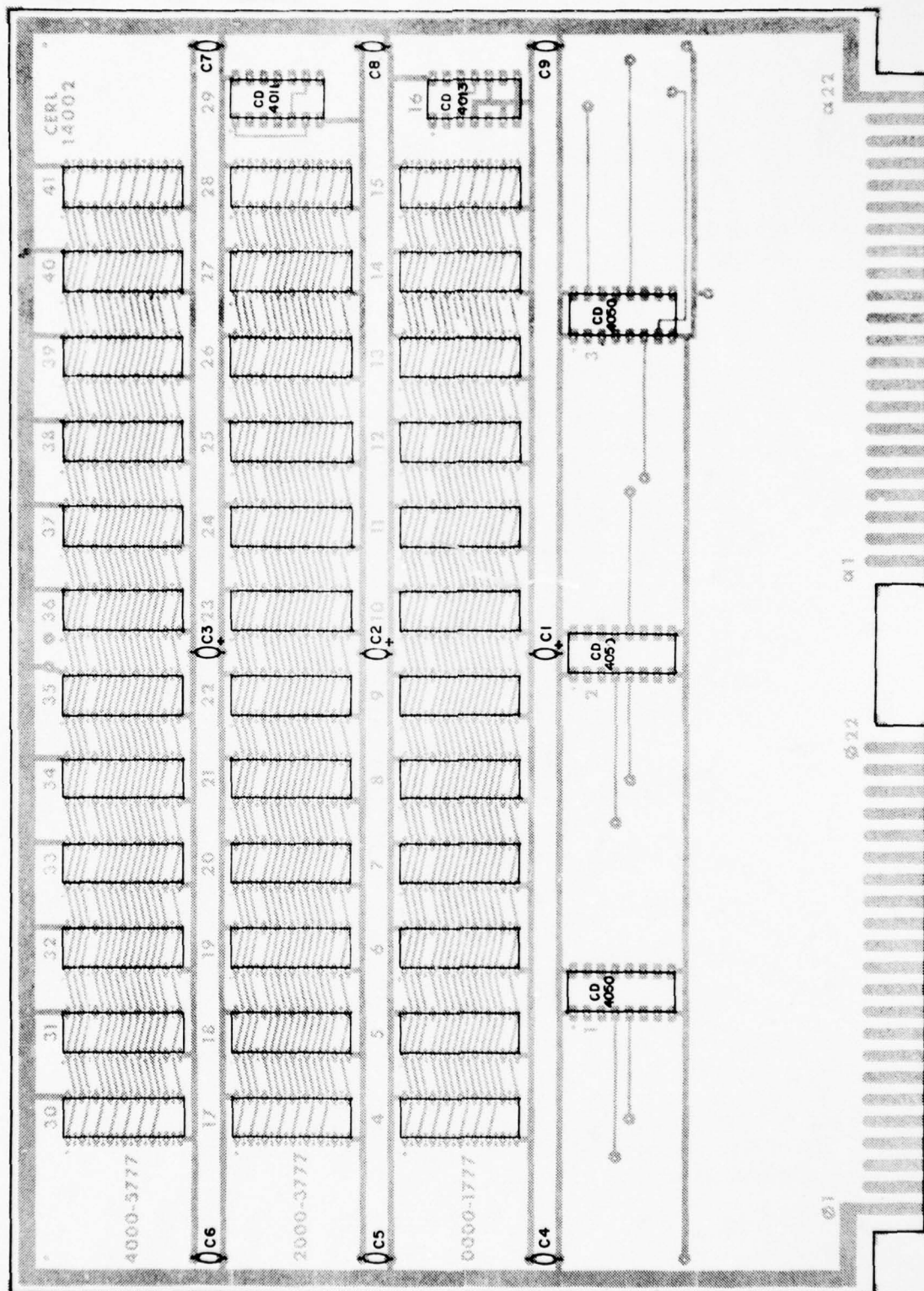
Table 12

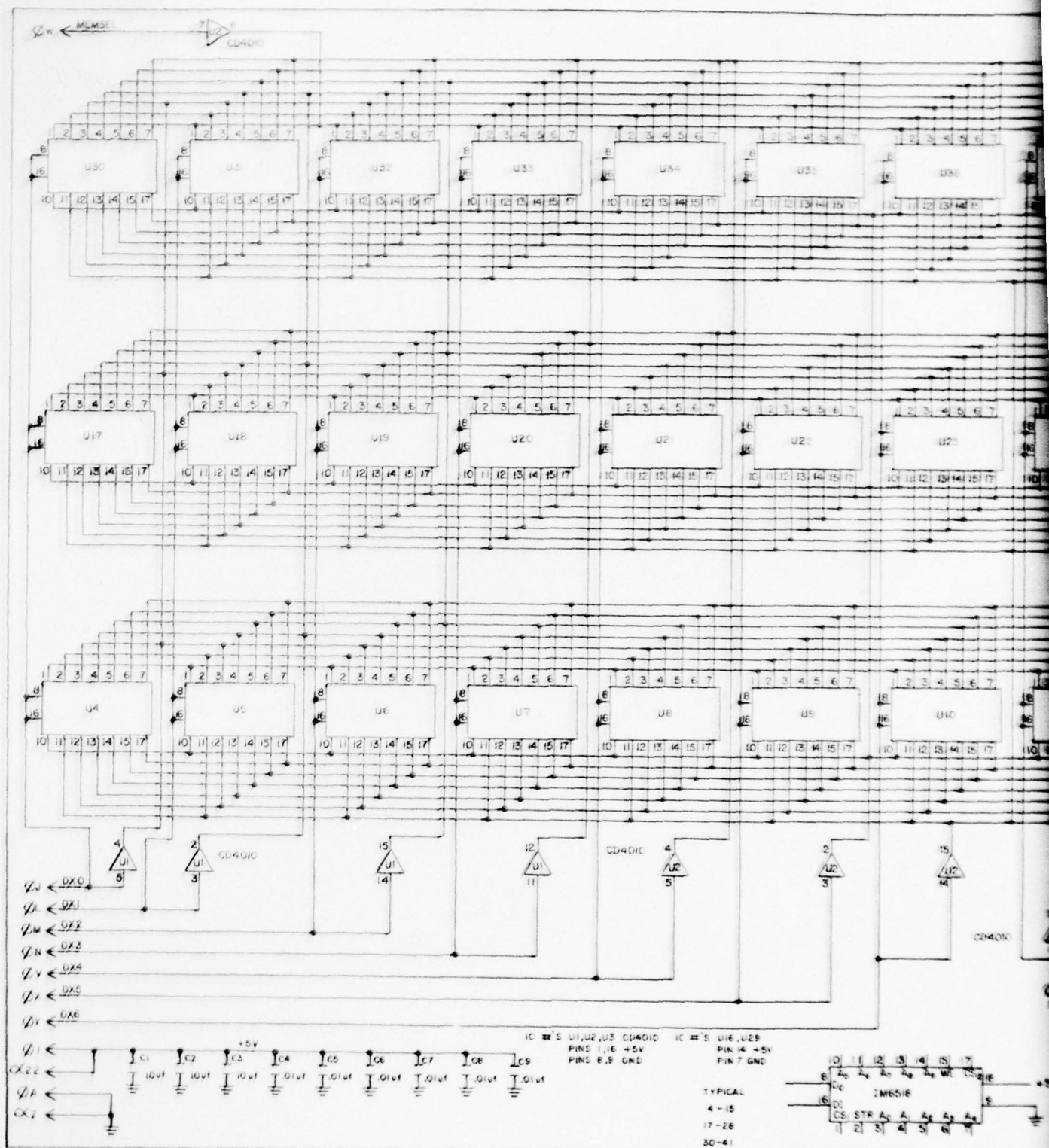
Board Number 14002 -- Parts List

Circuit Diagram Reference	Component Type				
C1, C2, C3	Tantalum	10 uF		35	V
C4, C5, C6, C7, C8, C9	Ceramic	.01 uF	disc	100	V
U1-U3	CD4010				
U4-U15, U17-U28, U30-U41	IM6518IDN				
U16	CD4013				
U29	CD4011				

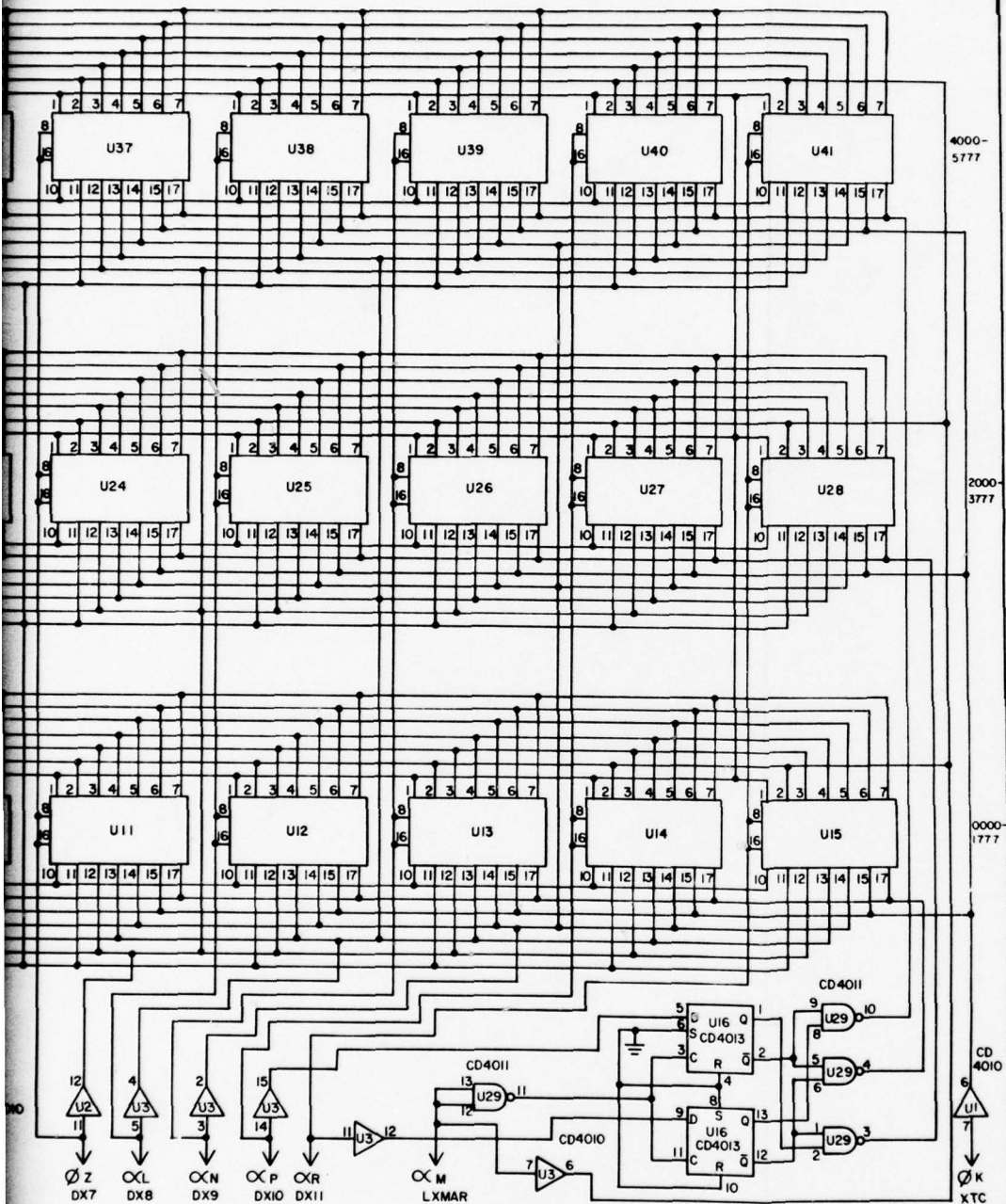
Note: Board 14002 has only 1U words of memory and has only U4-U15 installed. U17-28 and U30-41 must not be used unless less read only memory is used.

Board Slot 19 has a Board 14002 installed there. It can have 1, 2, or 3 kilo words installed. If less than 3 kilo-words is used, the sockets with the lower U designations should be used first.





REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



4000-5777

2000-3777

0000-1777

REQD	PART NO.	DESCRIPTION	MATL.	MATL. SPEC.	UNIT QTY.
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE AS SHOWN FINISHES ARE AS SHOWN			DRAWN R.W. 5/6/77 CHECKED J.M. 3/8/78 APPROVED A.J.A. 8/15/78 TRACED DATE	DIAGRAM, SCHEMATIC P.C. BOARD SCALE	DEPARTMENT OF THE ARMY CORPS OF ENGINEERS CONSTRUCTION ENGINEERING RESEARCH LABORATORY CHAMPAIGN, IL. Dwg. No. 14002
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Table 13

Board Number 15003 -- Parts List

Circuit Diagram Reference	Component Type				
R9, R27	Carbon	1/4W	5%	1	K Ω
R10, R15, R28	Carbon	1/4W	5%	1.8	K Ω
R11-R14, R20-R26, R16	Carbon	1/4W	5%	4.7	K Ω
R17, R19	Carbon	1/4W	5%	22	K Ω
R3, R5-R7, R18	Carbon	1/4W	5%	100	K Ω
R4, R8	Carbon	1/4W	5%	150	K Ω
R1, R2	Carbon	1/4W	5%	270	K Ω
C1-C3, C10	Ceramic	.01 μ F		100	V
C4	Tantalum	1 μ F		35	V
C5-C9	Tantalum	10 μ F		35	V
D1-D25	Silicon Diode 1N914B				
U7, U23, U24	CD4009				
U12-U14, U16-U18	F40098				
U15	CD4013				
U19	CD4020				
U19A, U22	SN54L74				
U20	IM6100IDL				
U21	Crystal Oscillator MF5406 4MHZ				

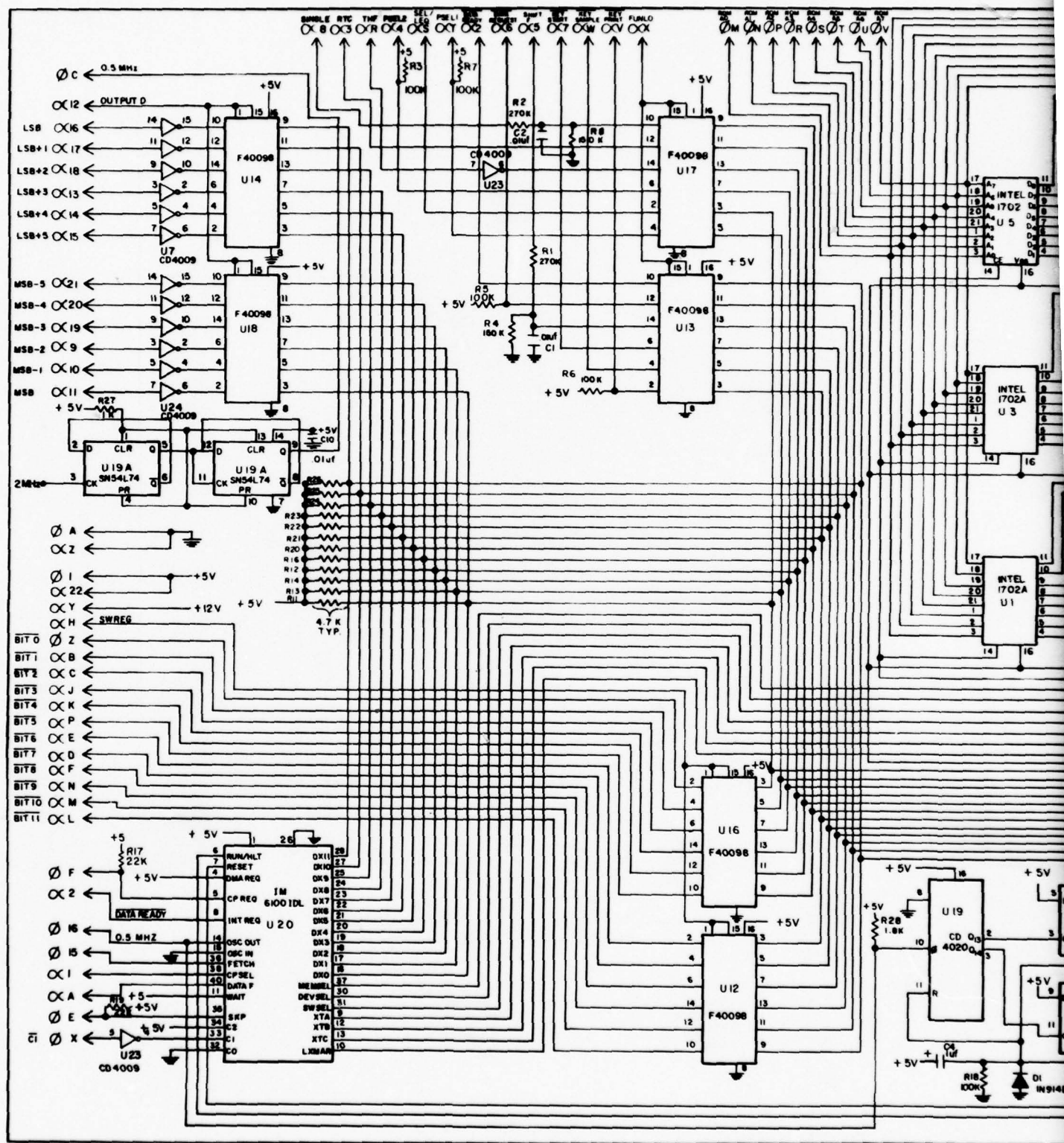
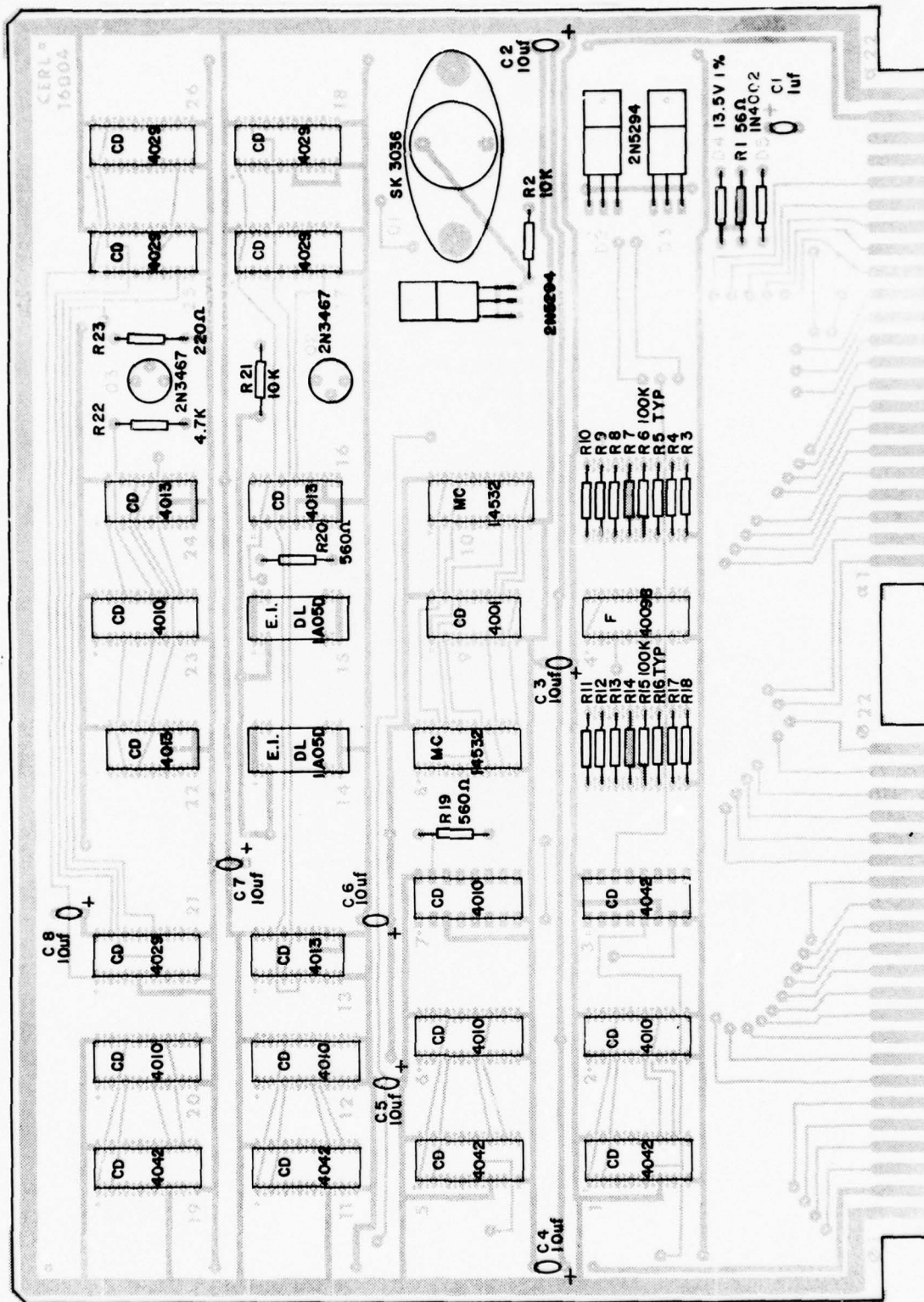




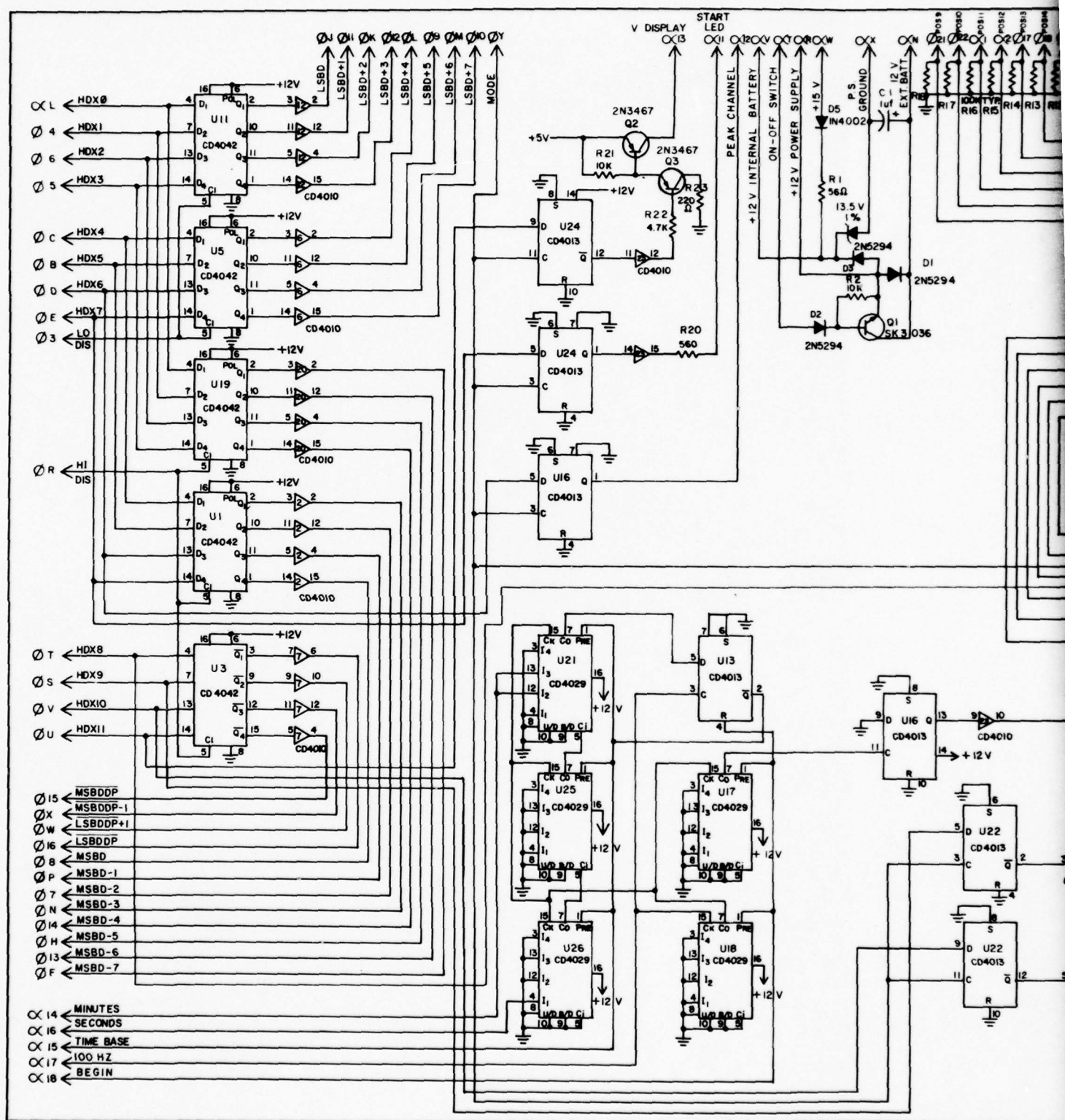
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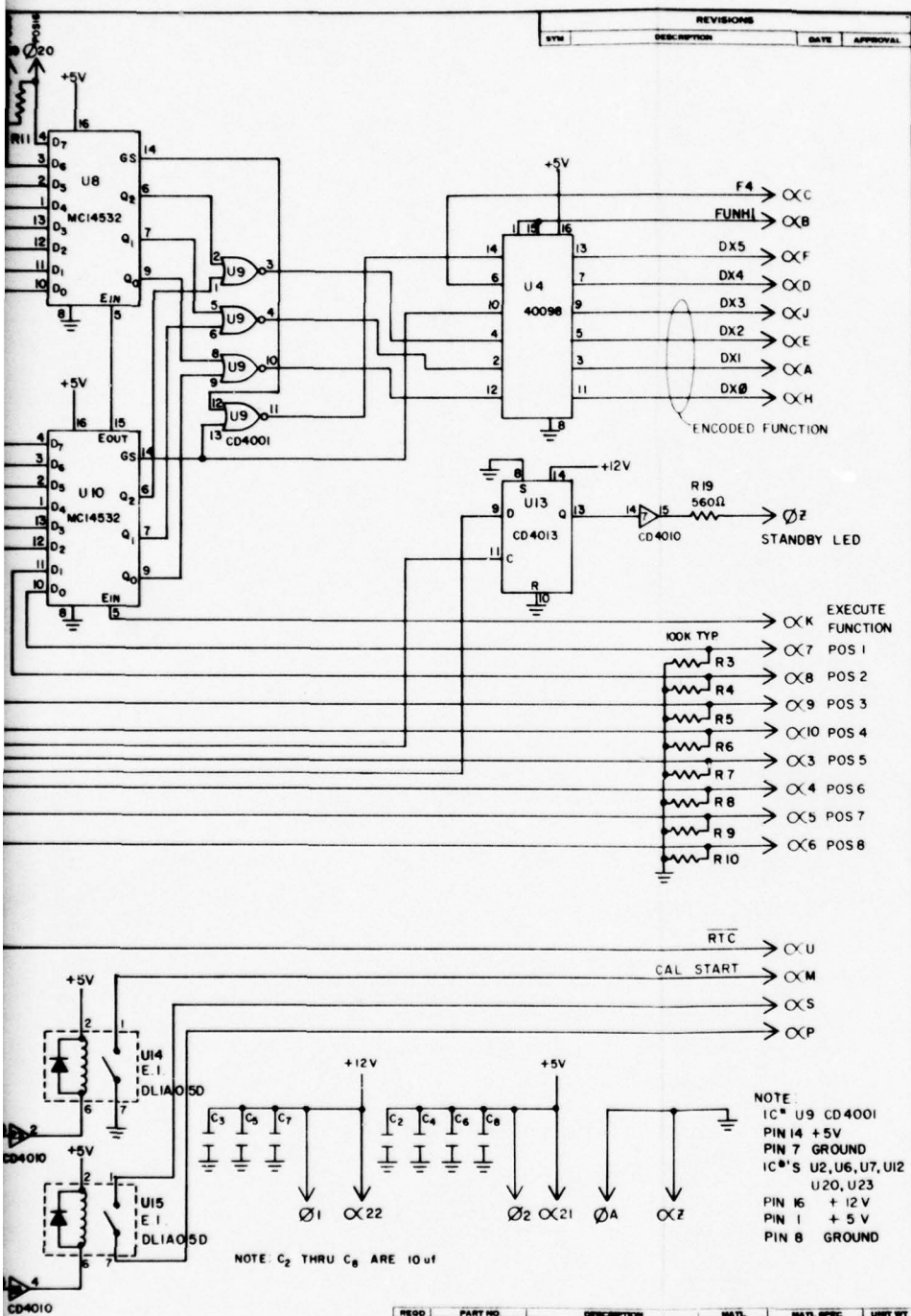
Board Number 16004 -- Parts List

Circuit Diagram Reference	Component Type				
R1	Carbon	1/4W	5%	56	Ω
R23	Carbon	1/4W	5%	220	Ω
R19, R20	Carbon	1/4W	5%	560	Ω
R22	Carbon	1/4W	5%	4.7 K	Ω
R2, R21	Carbon	1/4W	5%	10	K Ω
R3-R18	Carbon	1/4W	5%	100	K Ω
C1	Tantalum	1 μ F		35	V
C2-C8	Tantalum	10 μ F		35	V
D1-D3	Silicon Power Trans	NPN	2N5294		
D4	Zener	1/2W	1%	13.5	V
D5	Silicon Diode	IN4002			
Q1	Silicon High Power	NPN	SK3036		
Q2, Q3	Silicon Trans	PNP	2N3467		
U1, U3, U5, U11, U19	CD4042				
U2, U6, U7, U12, U20, U23	CD4010				
U4	F40098				
U8, U10	MC14532				
U9	CD4001				
U13, U16, U22, U24	CD4013				
U14, U15	EI DL 1A05D				
U17, U18, U21, U25, U26	CD4029				



NOTE: C2-C8 ARE BYPASS CAPACITORS. D1-D3 ARE POWER TRANSISTORS WITH EMITTER AND BASE CONNECTED TOGETHER FOR HIGH POWER DIODE.





REGD.	PART NO.	DESCRIPTION	MATERIAL	MATERIAL SPEC.	UNIT WT.
LIST OF MATERIAL					
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>UNLESS OTHERWISE SPECIFIED</p> <p>RESISTORS ARE IN OHMS</p> <p>RESISTOR TOLERANCE</p> <p>DECIMALS ANGLES</p> </div> <div style="width: 30%;"> <p>DRAWN R.W.W. 7/13/77</p> <p>CHECKED R.W.W. 8/1/78</p> <p>APPROVED J.A. 8/15/78</p> <p>TRACED</p> <p>DATE</p> </div> <div style="width: 30%; text-align: center;"> <p>DIAGRAM, SCHEMATIC</p> <p>P.C. BOARD</p> </div> <div style="width: 10%;"> <p>DEPARTMENT OF THE ARMY</p> <p>CONSTRUCTION ENGINEERING</p> <p>RESEARCH LABORATORY</p> <p>CHAMBERS HILL</p> </div> </div>					
<p>SCALE</p>					<p>DRWG NO</p> <p style="font-size: 1.5em;">16004</p>

Table 15

Board Number 17002 -- Parts List

Circuit Diagram Reference	Component Type				
R19, R20	Carbon	1/4W	5%	5.6 K	Ω
R9-R12	Carbon	1/4W	5%	10	K Ω
R17	Carbon	1/4W	5%	18	K Ω
R13-R15, R18	Carbon	1/4W	5%	39	K Ω
R16	Carbon	1/4W	5%	100	K Ω
R1-R8	Carbon	1/4W	5%	1	M Ω
C1-C6	Mica	10 pF		500	V
C7-C21	Tantalum	10 uF		35	V
D1, D2	Silicon	IN914B			
U1-U3, U13, U22, U31	CD4035				
U4	CD4023				
U6-U8	CD4029				
U10, U19, U28	CD4030				
U11, U20, U29	CD4008				
U12, U21, U30	F40085				
U14, U18, U26, U32, U36	CD4049				
U15, U17, U35	CD4013				
U16, U25, U27	MC14528				
U23, U33	F40098				
U24	CD4085				
U34	CD4011				
U9 (SW1)	Dipswitch 8 Station	SPST			



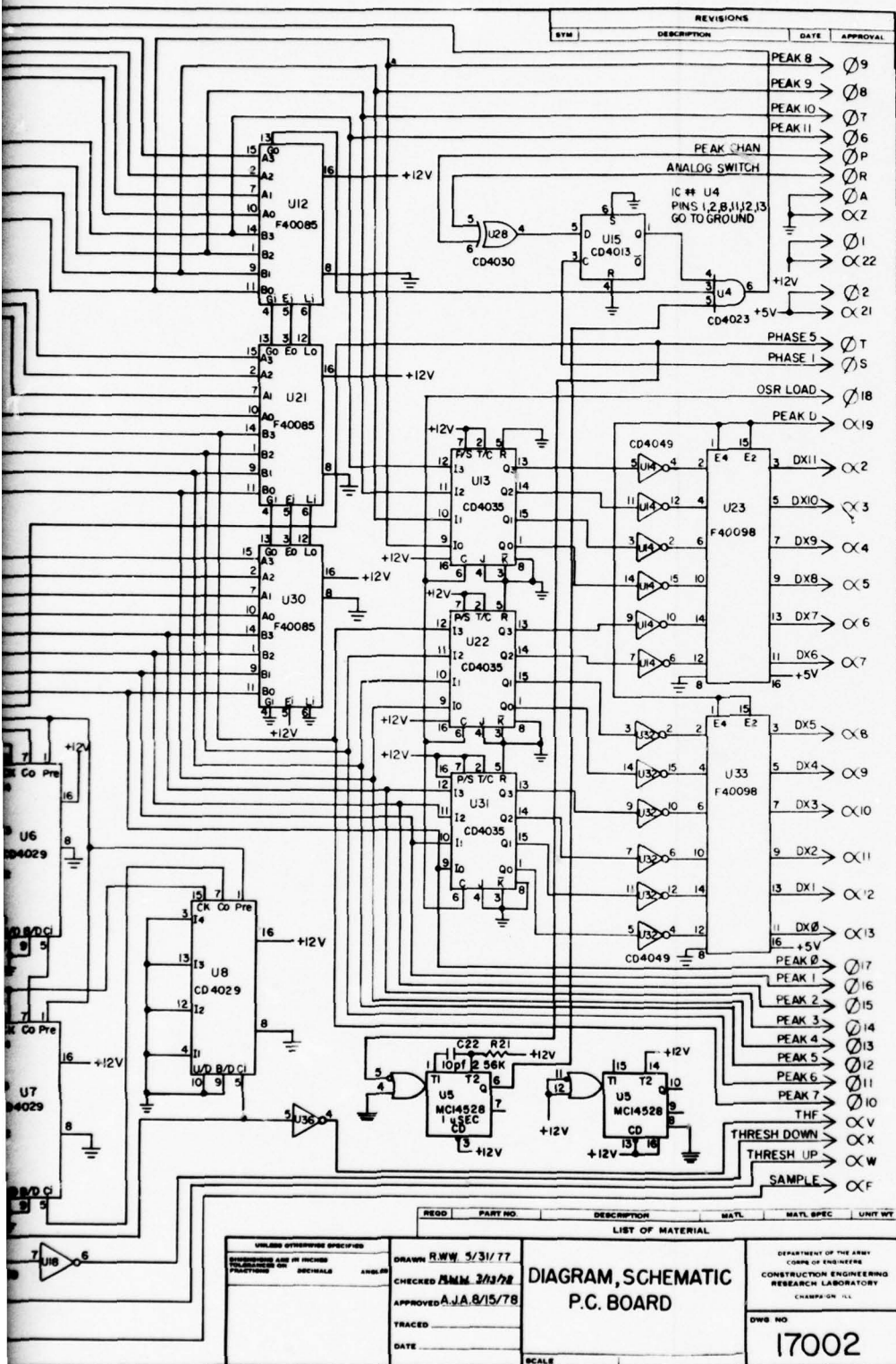


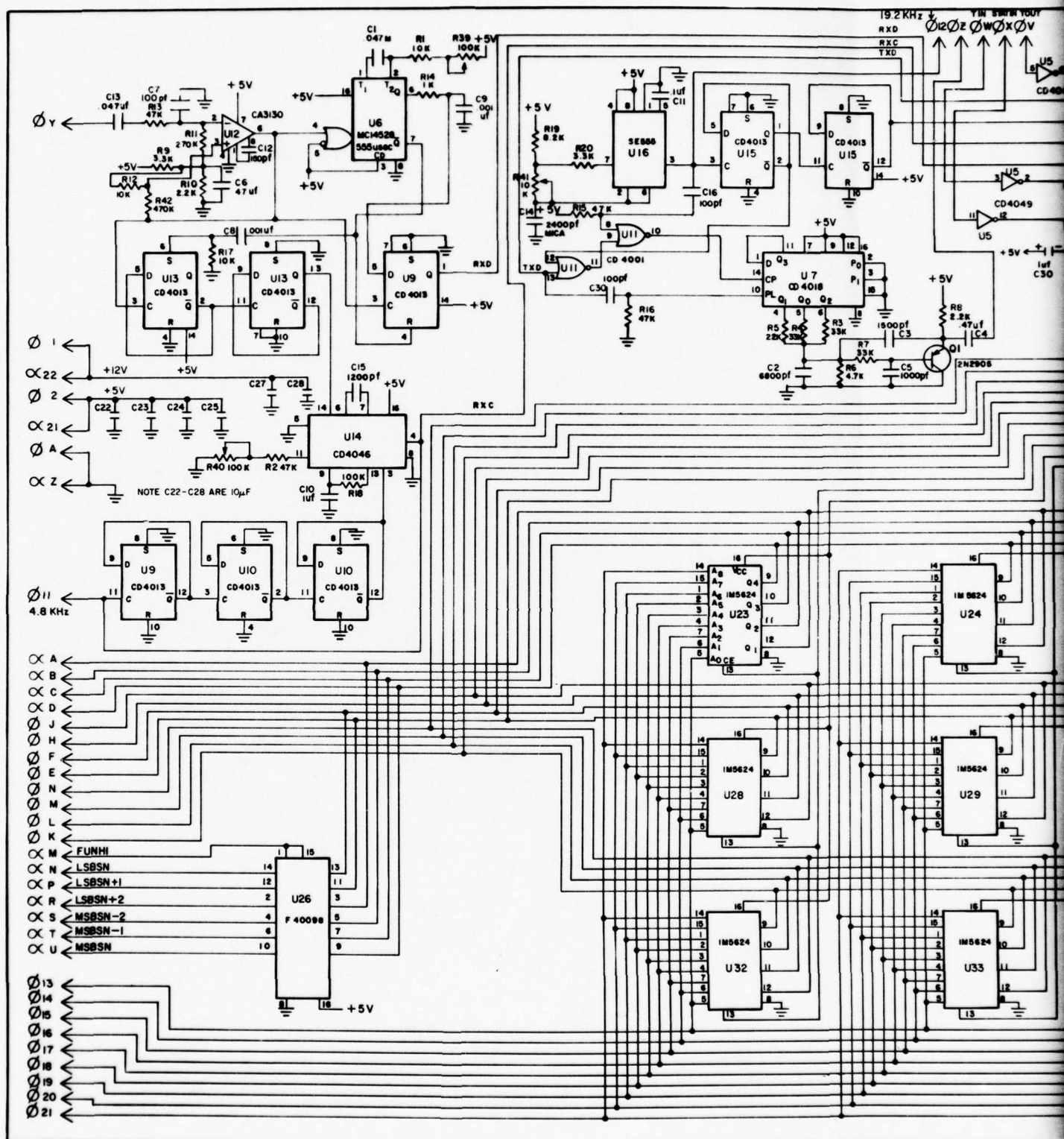
Table 16

Board Number 18002 -- Parts List

Circuit Diagram Reference	Component Type				
R22, R24, R26	Carbon	1/4W	5%	470	Ω
R27-R38	Carbon	1/4W	5%	560	Ω
R14, R21, R23, R25	Carbon	1/4W	5%	1	K Ω
R8, R10	Carbon	1/4W	5%	2.2	K Ω
R9, R20	Carbon	1/4W	5%	3.3	K Ω
R6	Carbon	1/4W	5%	4.7	K Ω
R19	Carbon	1/4W	5%	8.2	K Ω
R1, R12, R17	Carbon	1/4W	5%	10	K Ω
R5	Carbon	1/4W	5%	22	K Ω
R3, R4, R7	Carbon	1/4W	5%	33	K Ω
R2, R13, R15, R16	Carbon	1/4W	5%	47	K Ω
R18	Carbon	1/4W	5%	100	K Ω
R11	Carbon	1/4W	5%	270	K Ω
R42	Carbon	1/4W	5%	470	K Ω
R43	Carbon	1/4W	5%	1	M Ω
R41	Trimmer	Cermet		10	K Ω
R39, R40	Carbon	1/4W	5%	100	K Ω
C16, C19, C20, C30	Ceramic	100 pF		1	K V
C12, C17, C18, C21	Ceramic	150 pF		1	K V
C1	Mylar	.047 uF		100	V
C5, C7, C8, C9	Mylar	.001 uF		100	V
C15	Ceramic	1200 pF		1	K V
C3	Ceramic	1500 pF		1	K V
C14	Mica	2400 pF		500	V
C2	Ceramic	6800 pF		1	K V
C13	Ceramic	.047 uF		50	V
C11	Tantalum	.1 uF		35	V
C4	Tantalum	.47 uF		35	V
C10, C30	Tantalum	1 uF		35	V
C22-C29	Tantalum	10 uF		35	V
C6	Tantalum	47 uF		35	V
Q1	Silicon	PNP	2N2905		
Q2-Q4	Silicon	PNP	2N3467		
U5, U17	CD4009				
U6	MC14528				
U7	CD4018				
U8	IM6402IDL				
U9, U10, U13, U15, U19	CD4013				

Table 16 (Cont'd)

Circuit Diagram Reference	Component Type	
U11	CD4001	Timer
U12	CA3130AT	
U14	CD4046	
U16	SE555C	
U18	SN5404	
U20	CD4081	
U21	CD4556	
U22	CD4071	
U23-U25, U28-U30, U32-U34	IM5624	
U26, U31, U35	F40098	
U27	MC14514	



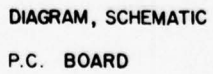
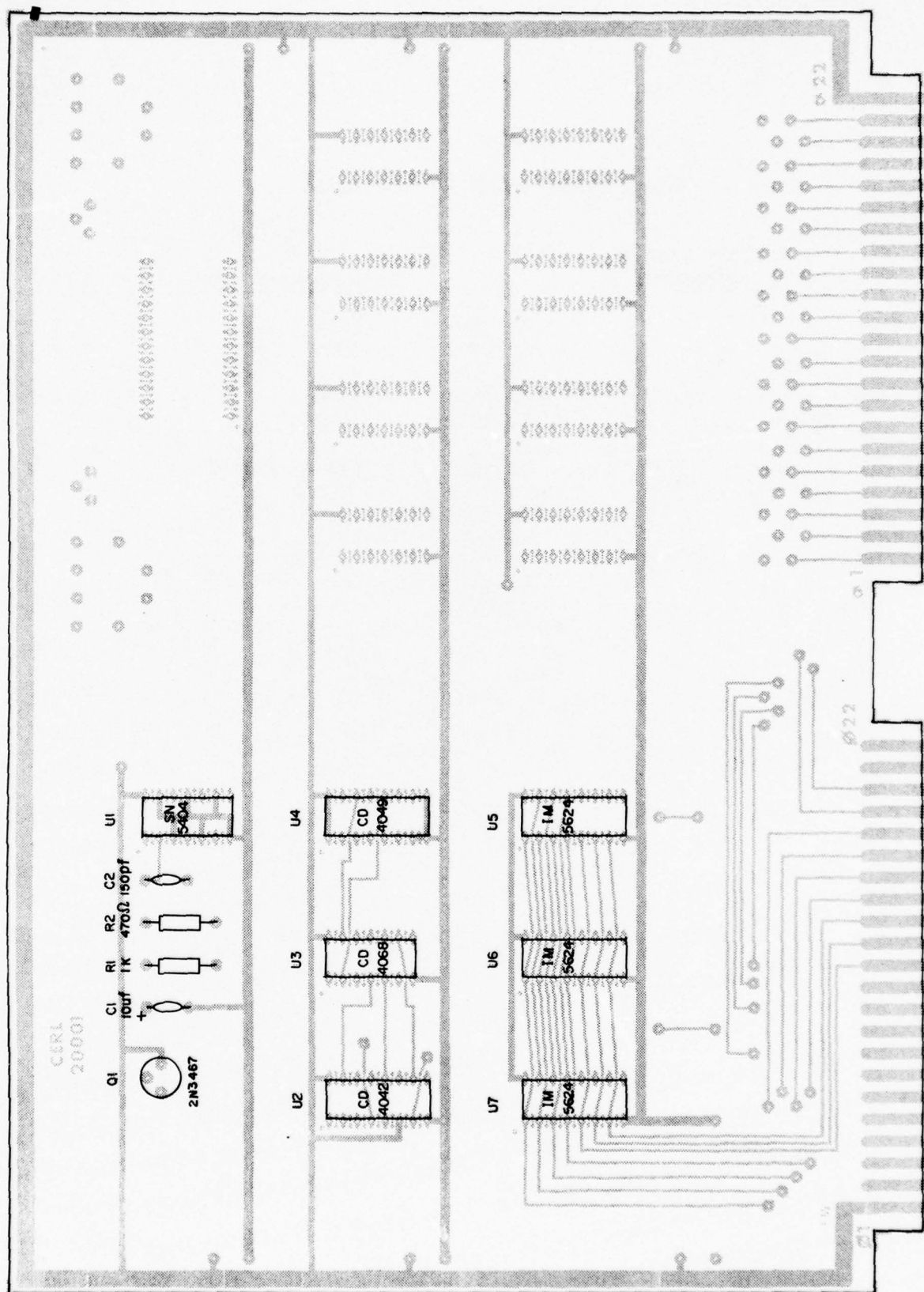
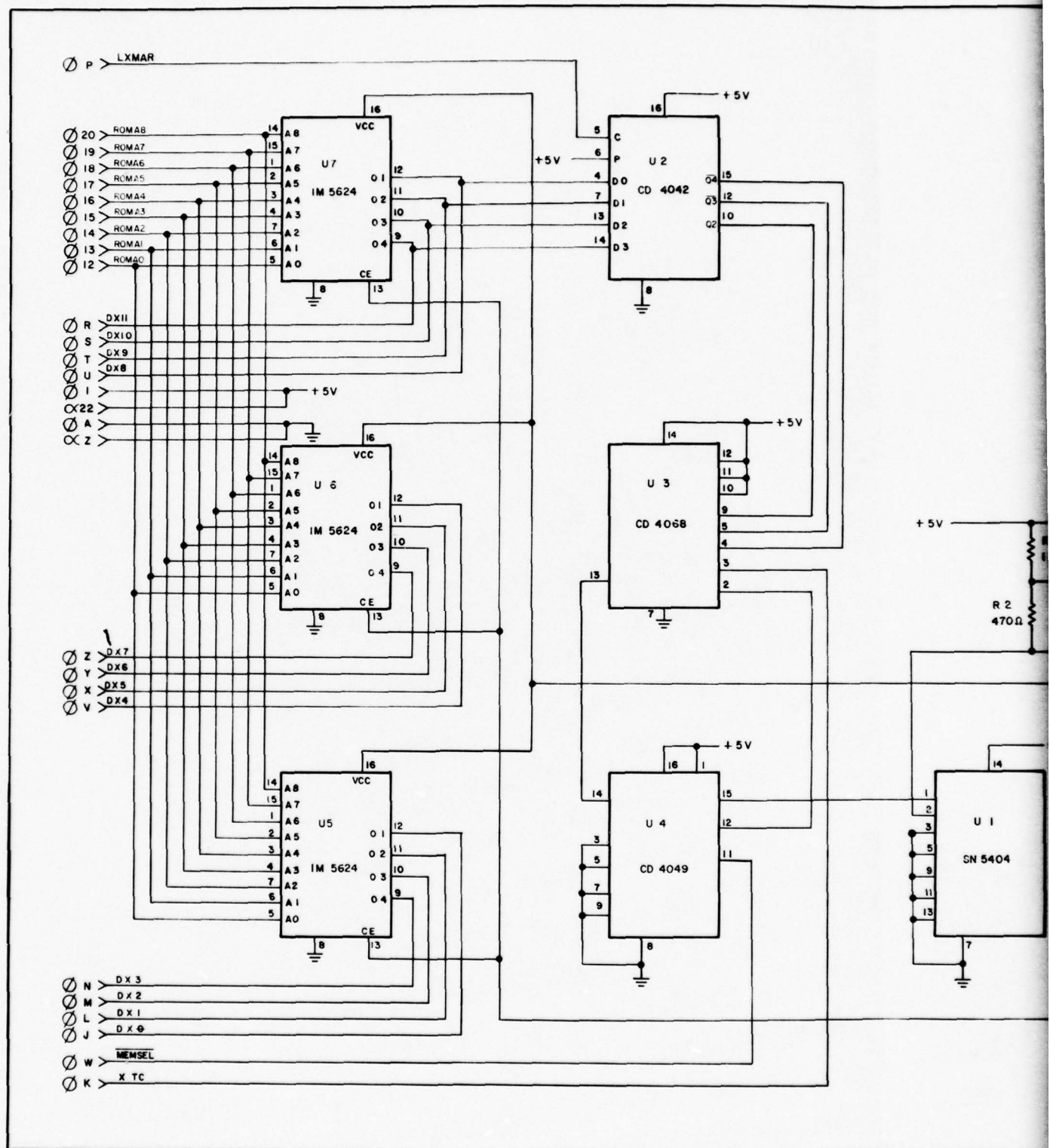
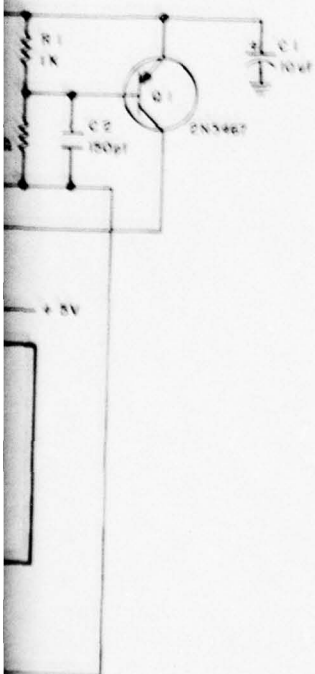


Table 17
Board Number 20001 -- Parts List

Circuit Diagram Reference		Component Type				
R2	Carbon	1/4W	5%	470	Ω	
R1	Carbon	1/4W	5%	1	K Ω	
C2	Ceramic	150 pF		1	K V	
C1, C3-C5	Tantalum	10 uF		35	V	
Q1	Silicon	PNP	2N3467			
U1	SN5404					
U2	CD4042					
U3	CD4068					
U4	CD4049					
U5-U7	IM5624					





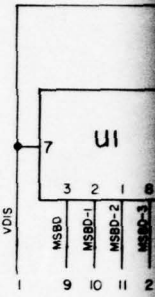


UNIT NO.		PART NO.		DESCRIPTION		DATE		REVISION		UNIT NO.	
1		1		SCHEMATIC, DIAGRAM		1		1		1	
1		1		P.C. BOARD		1		1		1	
1		1		20001		1		1		1	

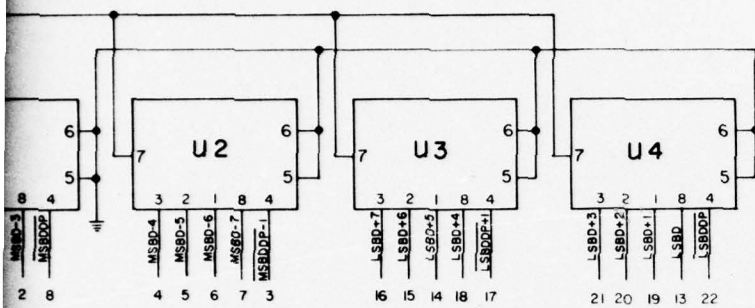
Table 18

Board Number 21001 -- Parts List

Circuit Diagram Reference	Component Type
U1-U4	HP5082-7300

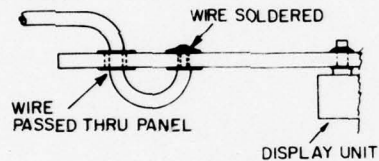


REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



22 WIRES ATTACHED TO BOARD PER DETAIL-A

SCHEMATIC DIAGRAM



DETAIL A



HP5082-7300
NUMERIC INDICATOR (4)

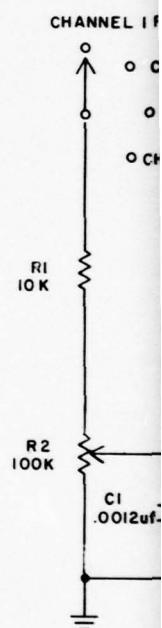
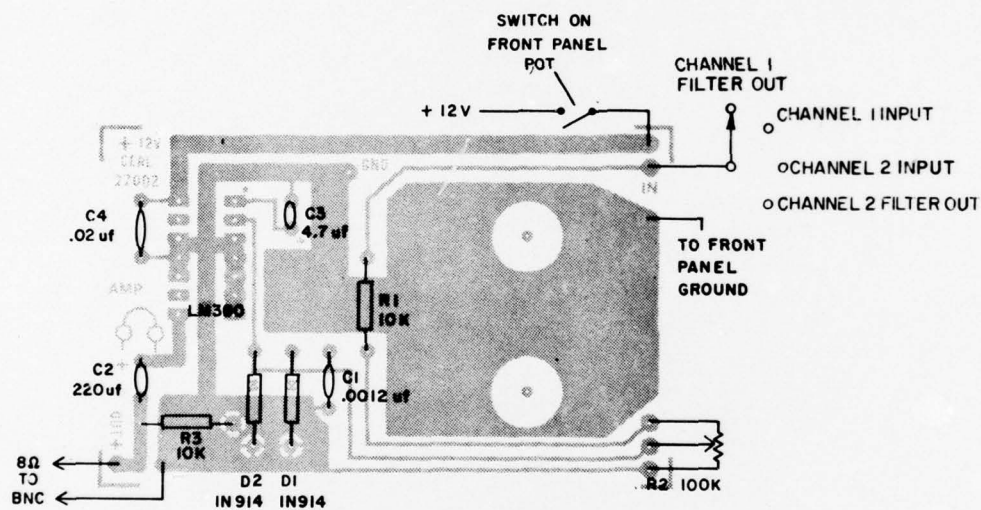
PARTS LAYOUT

REQD	PART NO	DESCRIPTION	MATL	QTYL SPEC	UNIT WT
LIST OF MATERIAL					
UNLESS OTHERWISE SPECIFIED		DRAWN J.H.O 9/23/78		DEPARTMENT OF THE ARMY	
ENGINEERED AND IN HOUSE		CHECKED		CORPS OF ENGINEERS	
PERMANENT AND		APPROVED A.J.A 9/23/78		CONSTRUCTION ENGINEERING	
FUNCTIONS		TRACED		RESEARCH LABORATORY	
DETAILS		DATE		CRAFFT-121 ILL	
ANGLES		SCALE		DWG NO	
		DISPLAY BOARD		21001	

Table 19

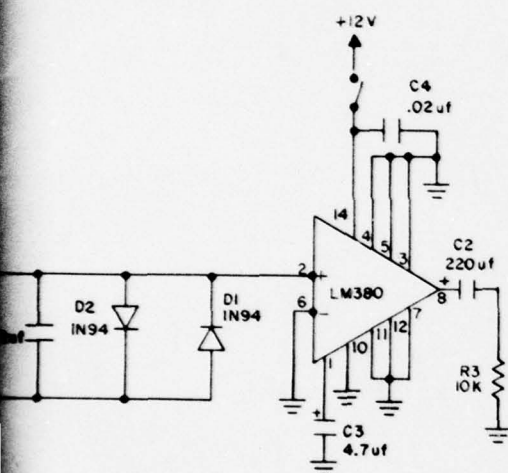
Board Number 22002 -- Parts List

Circuit Diagram Reference		Component Type				
R1, R3	Carbon	1/4W	5%	10	K	Ω
R2	Carbon Potentiometer with Switch		1W	100	K	Ω
C1	Ceramic	1.2nf		100	V	
C4	Ceramic	20 nf		100	V	
C3	Tantalum	4.7 μ f		35	V	
C2	Aluminum	220 μ f		25	V	
D1, D2	Silicon Diode		IN914B			
U1	LM380N					



UNLESS OTHERWISE SPECIFIED			REQD	PART NO.
DIMENSIONS ARE IN INCHES			DRAWN _____	
TOLERANCES ON			CHECKED _____	
FRACTIONS	DECIMALS	ANGLES	APPROVED JA. 8/15/78	
			TRACED _____	
			DATE _____	

FILTER OUT
 CHANNEL 1 INPUT
 CHANNEL 2 INPUT
 CHANNEL 2 FILTER OUT



DESCRIPTION	MATL	MATL SPEC	UNIT WT
LIST OF MATERIAL			

HEADPHONE
AMPLIFIER

DEPARTMENT OF THE ARMY
 CORPS OF ENGINEERS
 CONSTRUCTION ENGINEERING
 RESEARCH LABORATORY
 CHAMPAIGN, ILL.

DWG. NO.

22002

SCALE

7 CABLES AND CONNECTORS WIRING LISTS

The following are lists of wiring between the chassis and all connectors on the chassis and the wiring from connectors on the chassis to the side connectors. If a specific device is to be connected to one of the side connectors (for example, the monitor is designed so that a data printer can be connected to the output side connector), then the wiring is also given from the side connector to the device.

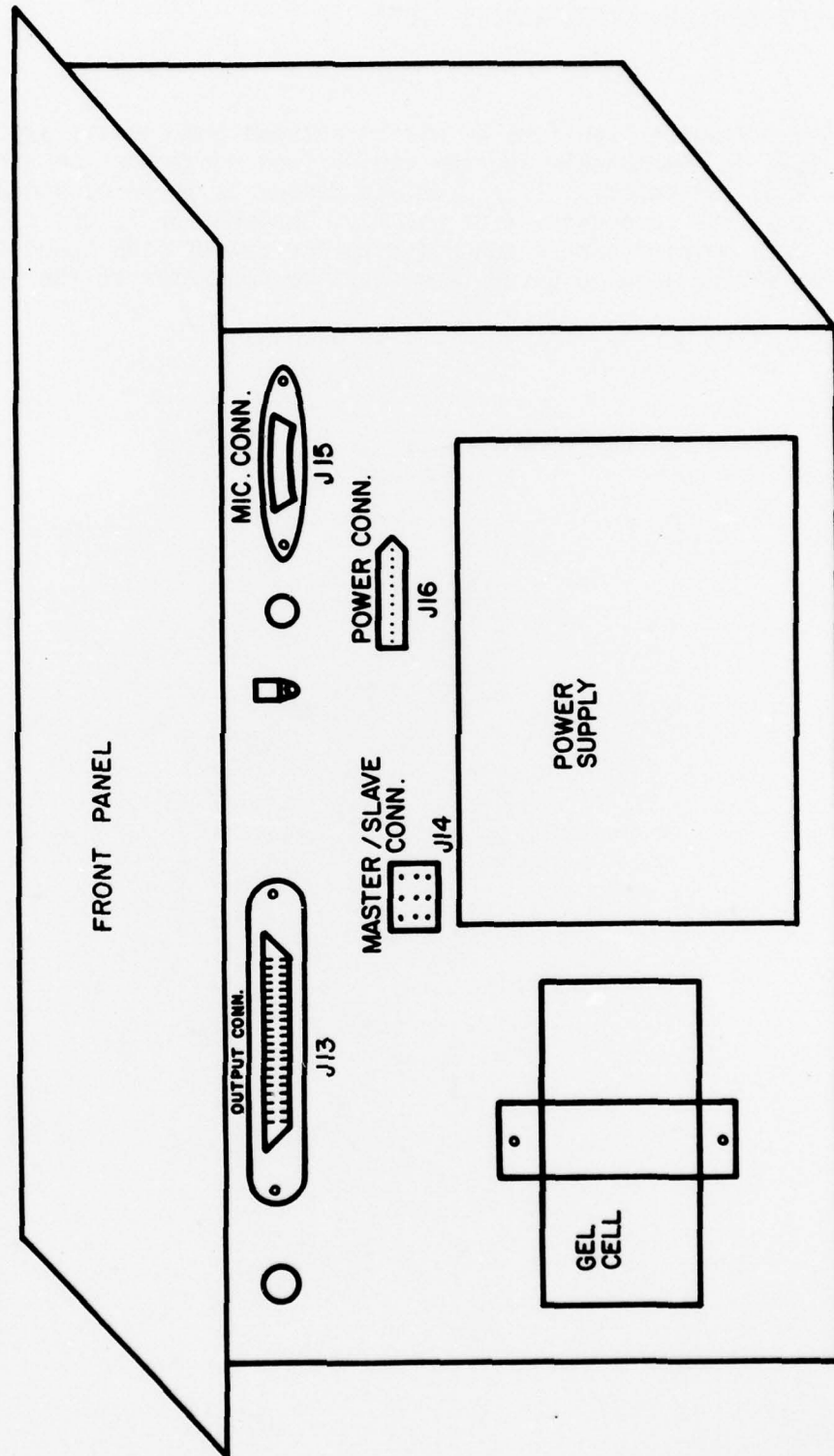


Figure 2. Layout of chassis connectors.

Table 20
Chassis to Side Connector Output

Monitor Signal Name	Chassis Connection	50 Pin Output Connector J13	Cable Color Code 52 Wire	48 Pin Side Conn. J17
PIO 36	12αE	31	WH/RED & ORG	A
PIO 35	12α6	33	ORG/WH & BLUE	B
PIO 34	12αF	6	BLUE/WH & ORG	C
PIO 33	12α5	44	GRN/WH & BLK	D
PIO 32	12αD	21	ORG/BLK & WH	E
PIO 31	12αK	10	WH/RED & BLUE	F
PIO 30	12α7	30	BLK/WH & GRN	G
PIO 29	12α2	16	BLUE/BLK	H
PIO 28	12α4	35	BLK/RED	J
PIO 27	12αJ	1	GRN	K
PIO 26	12α3	25	BLUE/WH & BLK	L
PIO 25	12αH	5	WH/BLK & GRN	M
PIO 24	12αM	49	RED/WH & BLUE	N
PIO 23	12α13	42	RED/BLK & GRN	P
PIO 22	12αN	40	GRN/BLK & ORG	Q
PIO 21	12α12	46	ORG/BLK	R
PIO 20	12αL	18	BLK	S
PIO 19	12αS	27	BLK/GRN & RED	T
PIO 18	12α14	22	RED/WH	U
PIO 17	12α9	7	GRN/WH & BLUE	V
PIO 16	12α11	20	WH/GRN & RED	W
PIO 15	12αR	2	WH/BLK & RED	X
PIO 14	12α10	4	RED/WH & BLK	Y
PIO 13	12αP	9	GRN/BLK	Z
PIO 12	12αU	43	RED	a
PIO 11	12α20	23	WH	b
PIO 10	12αV	12	ORG	c
PIO 9	12α19	14	GRN/WH	d
PIO 8	12αT	3	BLUE/RED & ORG	e
PIO 7	12αY	38	BLK/ORG & RED	f
PIO 6	12α21	11	ORG/GRN	g
PIO 5	12α16	39	BLK/WH & RED	h
PIO 4	12α18	24	RED/BLK	j
PIO 3	12αX	45	BLUE	k
PIO 2	12α17	13	BLUE/WH	l
PIO 1	12αW	34	RED/GRN	m
PRINT	11αN	36	SHIELDED WIRE	z
DATA REQUEST	15α6	15	ORG/BLUE & RED	t
LOGIC GND	P.S. DIG GND	41	GRN/RED & ORG	u

Table 20 (Cont'd)

Monitor Signal Name	Chassis Connection	50 Pin Output Connector J13	Cable Color Code 52 Wire	48 Pin Side Conn. J17
LOGIC GND	P.S. DIG GND	37	ORG/RED	v
LOGIC GND	P.S. DIG GND	17	BLK/WH & BLUE	w
+5 V	P.S. +5V	26	WH/BLK & BLUE	x
KEY PRINT	15αV	19	BLUE/RED	n
WINDY W	11α17	50	BLUE/RED & GRN	p
SHIELD	P.S. DIG GND	28	SHIELD	y
CHASSIS DIG GND	P.S. DIG GND	32	WH/RED	q
PSEL 2	15α 4	47	WH/BLK	r
PSEL 1	15α T	8	ORG/BLK & GRN	s
		48	ORG/GRN & RED	
		29	BLK/WH & ORG	

Table 21

Monitor Chassis to B&K 4921

Microphone 1

Monitor Signal Name	Monitor Connection	14 Pin Mic Conn. J15	Wire Type	Mic. 1 Monitor Side Conn. J19	Cable Color Code (Shielded)	B&K 4921 Connector	B&K 4921 Signal Name
CHASSIS	CHASSIS DIGITAL GROUND	10	BLK 24 GAUGE	J	WH/YEL	3	CASE GROUND
GROUND P.S.	P.S. DIGITAL GND	9	BLK 24 Gauge	A	WH/BLK	7	GROUND
ANALOG INPUT SEL. GND	1 ϕ 4	8	SHIELD	B	{ SHIELD OF WH/BLK SHIELD OF WH/RED }	7	GROUND
ANALOG INPUT SEL.	1 ϕ D	1	SHIELDED WIRE	C	WH/RED	8	SIGNAL OUTPUT
+12 V	P.S. +12 V	3	RED 24 GAUGE	N	RED	9 { 16 }	+EXT. BATT. HEATER
GROUND P.S.	P.S. DIGITAL GND	9	BLK 24 GAUGE	M	BLK	10	-EXT. BATT.
MIC CAL RELAY	16 \approx M	2	STRANDED GRN 24 GAUGE	D	WH/GRN	11	CAL. START
WIND METER SW TO 18 K Ω	F.P. SW24	4	STRANDED YELLOW 24 GAUGE	H	FROM PIN 10 THRU 47 Ω WH	15	HEATER
WIND METER SW TO 587 Ω	F.P. SW24	11	STRANDED	L	GRN	17	WIND DETECTOR
						18	WIND DETECTOR

Table 21 (Cont'd)

MICROPHONE 2

Monitor Signal Name	Monitor Connection	14 Pin Mic Conn. J15	Wire Type	Mic. 2 Monitor Side Conn. J20	Cable Color Code (Shielded)	B&K 4921 Connector	B&K 4921 Signal Name
CHASSIS GROUND P.S. ANALOG INPUT SEL. SND	CHASSIS DIGITAL GND P.S. DIGITAL GROUND 1 & 4	12 13 14	BLK 24 GAUGE BLK 24 GAUGE SHIELD	J A B	WH/YEL WH/BLK {SHIELD OF WH/BLK, SHIELD OF WH/RED}	3 7 7	CASE GROUND GROUND GROUND
ANALOG INPUT SEL. +12 V	1 & D P.S. +12 V	7 5	SHIELDED WIRE RED 24 GAUGE	C N	WH/RED RED	8 {9 16}	SIGNAL OUTPUT +EXT. BATT. HEATER
GROUND P.S.	P.S. DIGITAL GROUND	13	BLK 24 GAUGE	M	BLK	10	-EXT. BATT.
MIC CAL RELAY WIND METER SW TO 18 K Ω	16 & M F.P. SW 24	6 J19 PIN H	STRANDED GRN 24 GAUGE	D H	WH/GRN WH	11 17	CAL. START WIND DETECTOR
WIND METER SW TO 587 Ω	F.P. SW 24	J19 PIN L		L	GRN	18	WIND DETECTOR
					FROM PIN 10 THRU 47 Ω	15	HEATER

Table 22
Monitor to Master/Slave Connector

Monitor Connection	9 Pin Molex Connector J14	Cable Color Code	Monitor Side Connector J21	Monitor Signal Name Slave/Master
F.P. SW22 LEFT SIDE	7	WH	A	START/THRESH-UP
F.P. SW22 RIGHT SIDE	8	YEL	B	SAMPLE/THRESH-DOWN
17 α K	3	RED	C	WINDY BUS
	2	ORG	D	
	1	BLUE	E	
	5	BROWN	F	
GROUND	4	BLK	H	GROUND
	6	GRN	J	

Table 23

Power Connectors: Chassis to Side Connector

Power Supply Connection (See Diagram)	5 Pin Chassis Power Connector J16	5 Pin Side Connector J18
+12 V	1	D
+12 V Ground	2	C
120 V AC Hot	3	E
120 V AC Cold	4	A
3RD Wire Ground	5	B

Table 24
Mini Sample Tape Control Connector

Pin	Signal	Wire to
1	Windy Bus	9 & 21
2	Ground	Digital Ground
3		
4	Tape Motor Hi	180C
5	Tape Motor Lo	180D
6		
7	+5	+5 volts

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